CHEMICAL MARKETS

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One Great Union

MR. ALLEN in his talk at the Chemical Dinner last month made some remarks "off the record" which deserves even wider publicity than his sane and vigorous thoughts on the business situation which are printed elsewhere in this number. He touched lightly but firmly on the subject of combining the multitudinous chemical trade associations and scientific societies into one large industry-wide chemical organization.

THE logic behind this thought is irrefutable. Never was the need so great for a united front on the part of all chemical interests throughout this country. At no time has the need for the rather remarkable economies which could be effected by centralizing all of this association work been so great as it is at the present.

THIS is not a new thought. During the war the Chemical Alliance gave a practical demonstration of what all branches of chemical industry working together in common cause, through a single organization, can accomplish. The example of the force and efficiency of one industrial organization has been set up before us in a number of other fields, notably, in steel, automobile, paint and paper industries. We have in these columns often advocated such a move and as recently as the summer of 1928, having agitated the subject, questionnaired a thousand leading executives in the chemical field and received an affirmative answer in favor of the single organization from 242 as against the 33 who preferred the specialized scattered effort of the day.

IT IS no great secret why the proposal so logical and so widely supported by the executives of the industry should not have long since been put into effect. Sane as it is, efficient as it would be, and despite the great savings in organization work expenditures which it would effect, the single chemical trade association has failed to materialize due chiefly to the petty pride of the existing associations and societies. They have been unwilling to sacrifice their individuality and they have made the poor excuse that they would be unable to preform as efficient service for their particular interests if they merged their effort with the common cause of the industry as a whole. If this movement which Mr. Allen has initiated again fails it will doubtless be because of these same causes. They can only be effective if the membership at large of these associations allow a near-sighted egoism to prevail at a time when a broad visioned cooperation is necessary to protect our entire industrial structure.

Stability What the whole world needs is stability. A steady demand to consume a constant production; regular employment—firm prices—sound credit, these are the cherished desire of workers, of industrialists and tradesmen, of financiers. It is instability which worries and frightens. Amid all the fine theories of economic cause and effect, all the erudite explanations of the world's plight, all the grandiose schemes to right matters, distrust of the future is the dominant motive of these times. It is not a motive that makes for stability, yet stability is what is most surely needed.

However much our personal actions may be fear-ridden, we broadly recognize this truth; and we must applaud President Hoover's speech before the International Chamber of Commerce in which he emphasized this universal uncertainty and pointed out that it could be banished through individual effort of bussiness men.

Well, what are we going to do about it ?

Let's suppose—for a moment—that the leaders of our chemical industries took "Stability" as their motto and governed themselves accordingly.

The mind reels at the prospect of the millenium that would follow the universal adoption of chemical industry stability as a matter of individual company policy. This is plainly altogether too visionary—human nature being what it is and the times being what they are.

Let us then adopt a more conservative, purely negative point-of-view and imagine what would be the result if the industry merely determined not to do those things which have been often proved to make for instability. Three acts would certainly be taboo:

1. Keeping any plant on a full production schedule when the demand for its products has been severely curtailed.

2. Trying to keep plant operations up to normal by undertaking to make new or different chemicals of which there is already an adequate supply.

3. Cutting prices in order to increase sales when we know this does not increase chemical consumption and such tactics must of necessity result only in stealing customers away from a legitimate competitor.

Even this, we admit, seem Utopian. But it is possible, as we all know, to accomplish much by a conscious effort to consider specific problems with a thought to the stability of the whole industry.

Financial Leadership We have our styles in executives and style changes occur with almost as much rapidity as in motor car design. Roy Dickinson in an article, "Bored With Bankers"—An Emergence or Perhaps a Revolt of Management is Under Way, appearing in "Printer's Ink" on April 2nd, enters a rather severe arraignment of some types of banker now quite visible in the business world. His point is that the banker is primarily a merchant of credit and that credit is but one phase of the larger question of management, albeit it is a most important one.

The science of management will grow rapidly in the future. The industrial growth of the country, the amazing development of the large corporation and now through amalgamation and absorption of large corporations into the super-corporation we must have men trained intensively along management lines to direct these mammoth structures, if they are to prove invulnerable to attacks of red tape, lack of personal interest, and a hundred other dangers. Certainly the usual type of banking mind is badly suited to handle the problems, for example, of company relationship with the public or its employees. We have made the strides industrially that we have in the past ten or fifteen years because we have become a nation of specialists. We cannot afford to lag behind the procession in the matter of management. If we do we will cease to progress. It is always easier to slide down the hill than it was to climb up.

Export Fallacies In the chemical industry there is little enthusiasm for the proposal that we solve our common national problem of over-production by exporting our surplus. Such indifference to this tempting proposal has called forth caustic comments among the advocates of the facile export theory.

The gist of this criticism is to the effect that our chemical executives are selfish and ignorant. Granting our indifference to foreign chemical markets and admitting even that it arises from the knowledge that the whole chemical trade of the Argentine, for example, makes a rather pitiful comparison with the chemical consumption say of Rhode Island, nevertheless, we should like to point out certain elements of great foresight in the position of our chemical industrialists who stand firmly against an export campaign.

First, our chemical over-production is not a unique economic phenomenon. It can be

matched by a similar surplus of the same products in England, Germany, France, Italy, Belgium, Japan, to say nothing of certain specific over-productions even in Switzerland, Poland, and Czechoslovakia. The chemical group of industries were more stimulated by the war than any other, and the war moreover taught, by bitter experience, the key position of chemicals. Accordingly, sustaining the world-wide chemical over-production is the firm determination of every nation with any military or industrial position to maintain that it shall be chemically self-sufficient. Even if we are able to produce an important chemical far below world costs, we find—or may expect shortly to find—every worthwhile industrial market abroad closed by tariff or subsidy to the local producing competitors.

Furthermore, chemicals are sophisticated commodities. Peculiarly they are the raw materials of a civilized community. The Hottentot uses no caustic soda. There is no sulfuric acid demand in Baffin's Bay. Only as a country becomes industrialized does it create a chemical market; but as it develops a national effective demand, it quickly becomes ambitious to supply its own chemical needs. The basic industrial chemicals are in the main easily produced from materials common to many lands, while their low price and the dangers or difficulties of transport give always an initial advantage to the maker closest to the market.

The economic theorist who would cure our over-production by exportation neglects these considerations so evident to the chemical industrialist. What wit is there in waging a bitter trade war in a restricted and diminishing foreign market, a struggle that invites price reprisals at home and tariff retaliations abroad?

We suspect that these same considerations apply with equal force to a number of American industries outside our chemical group.

Misinformed Propaganda It is not surprising that the public is entirely ignorant that by law the health agencies of the Federal Government may accept contributions from private individuals or corporations to conduct investigations on industrial problems holding a possible health hazard. It is a little more surprising that within the chemical industry there should be a large numbers unacquainted with the provision of this law. The recent reports on methanol as an anti-freeze and methyl chloride as refrigerant may or may not be scientifically correct, but we decry the spreading of propaganda to the effect that these investigations were not carried on in a professional and highly ethical manner. An analogous situation arose when tetra-ethyl lead was investigated. Time has shown that the conclusions drawn then were substantially correct, despite considerable agitation at the time to the contrary.

It is perfectly proper that the health agencies of the government should be permitted to work with private interests in this manner. There are problems arising from time to time that of necessity must be investigated. Certainly the laboratories of the Federal government appears the logical place to have these experiments conducted rather than in a private one. But if the Government has not provided the funds and the facilities for the necessary research, it is better done under by private agencies that assure competent work and a full publication, under Government auspices, of the results.

The time has come to talk of helpful things and for the consideration of constructive policies, the promulgation of which throughout the industry will bring it back to sane and solvent operation.—*The Paper Industry.*

Not all wars are announced by formal declaration. America has been at war for the past 19 months, although many do not know it. The casualties we have suffered in the great economic struggle have been 15 times as great as those that we experienced overseas in 1917-1918. At least 5,000,000 Americans have been rendered hors-de-combat in the struggle to make a living. 'This vast army is now undergoing economic hospitalization. Dole, or no dole, the rest of the nation must pay for taking care of this army of industrial disabled.—*Iron Age.*

Fifteen Years Ago

(From our issue of June, 1916)

The estate of L. Stuart Wing of Wing and Evans is appraised at $1,108,030.

William Hamlin Childs, President Barrett Co., tells American Iron and Steel Institute that American dye industry needs protection to succeed.

A Tariff Commission is urged by Congressman McCullough.

New York Quinine & Chemical Works starts work on a new plant on the site of the original factory.

The Tupper Lake Chemical Co. has just completed the largest retort in the country for the manufacture of wood alcohol, acetate, and charcoal.

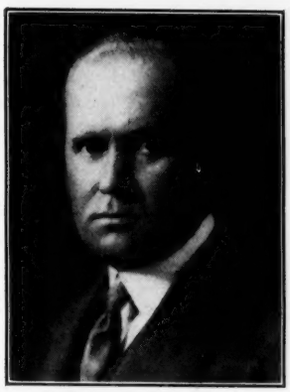
Monmouth Chemical Co., Jersey City is incorporated with a capital of $250,000.

Federal Dyestuffs and Chemical Co. makes the largest shipment of American made dyes, (45,264 lbs.), from its plant at Kingsport, Tenn.

The Challenge of 1931

By E. M. Allen*

WE ARE accustomed to refer to the business situation in terms of an era of depression. This is incorrect, for we are in the throes of an economic revolution and emerging into a new era. The stability and the permanence of our existing organization and business structure is on trial, and the question is, are we going to have a continuation of individualism or a process of socialization ? From our Federal and State capitols we hear the political pleas for increased federal and state participation in and control of business. It is a challenge to our present economic system. We must not deceive ourselves, for the trends are definitely toward socialization. Therefore, we ask, "How far will this Russianization proceed ? What is the answer of American business ?"



Mr. Allen's address at the Chemical Industries Dinner was received with such a spontaneous outburst of genuine approbation by the three hundred or more of the industry's leaders present, that we believe it our duty to present it in its complete form to the readers of CHEMICAL MARKETS. "Neither the wild eyed politician nor the demagogue has the remedy" says Mr. Allen, "The solution rests squarely upon the shoulders of the American business man." He reviews in his crisp, direct way, Russia, taxation, anti trust laws and the tariff, the four most pressing problems in the national and international situation. He advances one solution and perhaps the only solution to the question we are all asking, "How may we help to revive business?"

We are all familiar with the complete failure of attempts by many of the world's nations at price fixing, as in coffee, rubber and wheat. Glaring examples of government failures in business. The federal operation and control of railroads cannot be termed a success. Muscle Shoals is still a live issue. If our Government is to sell electrical energy it is but a step more to other forms of energy, namely, the production and transportation of coal and oil. Furthermore, there is a serious legal question as to the constitutionality of certain of the present federal operations as they involve the use of the power and resources of all the people, to destroy the business and the savings of a part of the people.

Russia

In our political system, the individual is first, and in Russia the political system is first. The fanatical devotion of the emotional Slav to the Russian fetish is a threat to the standards of other countries. What other nation is content with a diet of herring and black broth, plus the absence of home ties and religion ?

On the Soviet five year plan there are two schools of thought. First, it is contended that the plan is doomed to a failure which will not make an economic ripple on the world trade; Second, that it is an immediate threat to existing systems in every civilized country. A careful scrutiny of the facts shows that the progress of the five-year plan, while somewhat behind schedule, is very positive along both industrial and agricultural lines. The price position of soviet exports is well known. Cost of production is not considered. The significant point is the position of the Soviet labor, for the labor cost is a complete unknown quantity in all Russian merchandise. The cost of wheat at the ports of exportation to the Soviet is essentially the cost of transportation from the fields to the markets of exportation. Whether you take timber or manufactured products, labor continues, and will always be as long as the present system exists, a negligible unrecognized quantity.

In Barron's Weekly, May 4th, there is a paragraph that states:

> "Soviet Russia will cut grain exports in proportion as it is able to obtain foreign credits. Will retain grain and other consumers' goods within its borders if it can obtain credits for purchase of machinery and other producers' goods. This policy is directed in large part against the United States, which is large potential credit source and which is heavily interested in world market for grain."

*President, The Mathieson Alkali Works.

This is the world's example of international racketeering.

The avowed purpose of the Russian system —to extinguish the organized industrial systems of other nations of the world, together with the persistent and continuous propaganda from that country through every nation of the globe, is a threat we can not pass by. Our answer to this system of individual improverishment, is a system of counter propaganda on the basis of the actual facts concerning the tremendous advantages possessed by the American workingman in this country. Nowhere in the wide world has the workingman so high a standard of living —nowhere has the industrialist made more continuous and more conscientious efforts to better the position of the workingman. Our aim is the continuation of this upward movement and not the enslavement of the worker so successfully accomplished by the Soviet Government.

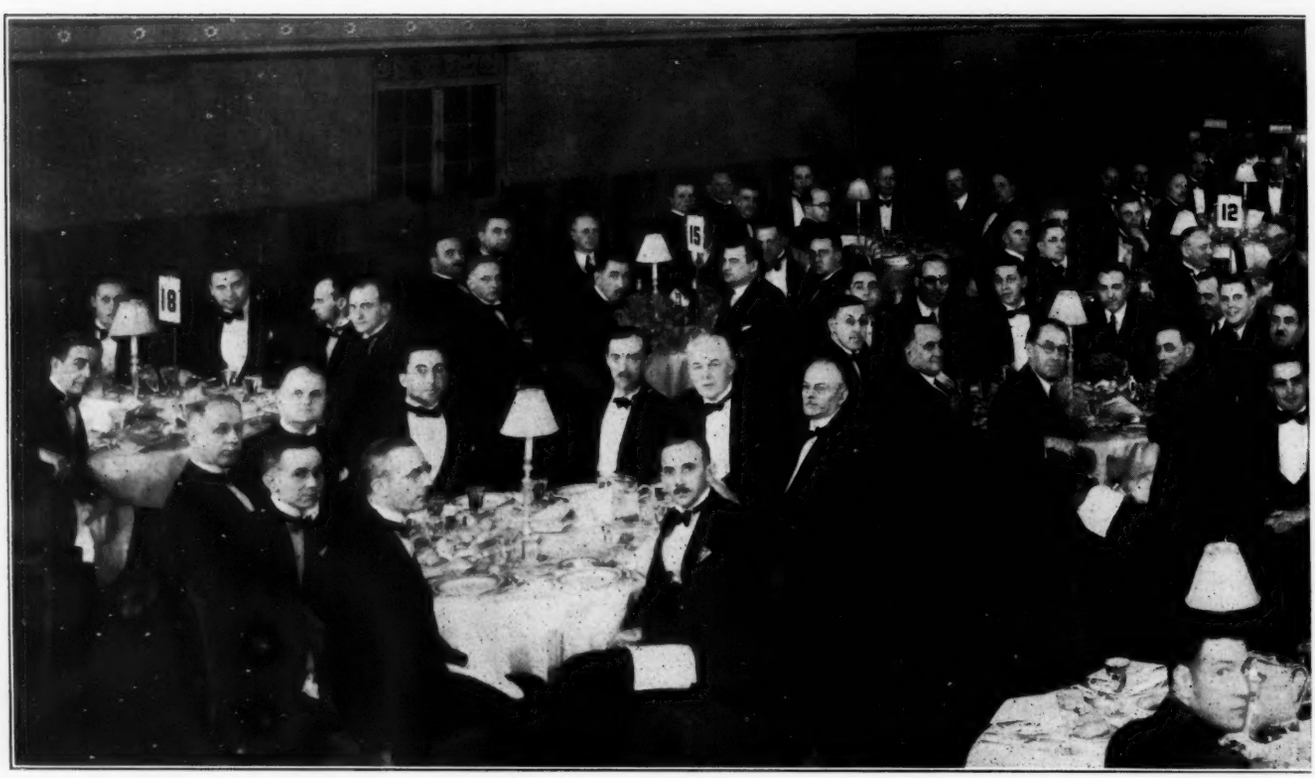
Taxation

Every one must follow with keen interest and alarm the trends of taxation in Great Britain, and has heard the statement of Sir Ernest Benn that the per capita debt of England in 1900 of $90, has risen to the stupenduous figure of $2,500 per capita in 1930. Unless effective measures can be taken to curtail expenditures, the tax burden of that country will effect a collapse of the British economic system.

The experiences of England are not remote from those in our United States. The tremendous increases in local, state and federal taxation are raising a problem of gigantic proportions. About 12% of our national income goes to taxation. The outstanding debt of State and local governments has risen from $33 per capita in 1913 to over $105 in 1928. In all fields of government endeavor taxation is increasing. We have the constant drain on the Treasury for the two politically favored groups, the veterans and the farmer, and there is little prospect of reducing or curtailing this burden. Our Treasury deficit for the year ending June 30 will overrun one billion dollars.

I have watched with keen interest consideration of tax measures in our various State legislative sessions of this winter. It is almost impossible to find a single case where genuine efforts are being made to reduce expenditures. It is, in fact, the common rule of the politician to either shift the tax burden, or more commonly to add on more and more tax burdens. The only successful efforts to curtail taxes have been where business groups have unselfishly devoted their time and energy to prevent fantastic and unsound tax measures being saddled on the people.

We are developing a new kind of bread line—the town looks to the county for certain financial support, the county looks to the State and the State looks to the Federal Treasury, and the corollary of this process is that the Federal Government is supervising a part of the State operations, the State a part of the county operations, and the county a part of the town operations.



Seventh Chemical Industries Dinner, held in

Is prosperity to be limited to those who work for local, state or federal government ?

This tax question as never before, concerns us all—the workingman, the farmer and the business man, and if there is ever to be a solution it must come from a strong public sentiment against waste and unsound expenditures.

Anti Trust Laws

We have had a host of remedies suggested, many urge a revision of our anti trust laws, which were written at a time when conditions were totally different from those existing today. No one doubts the wisdom of a legal check against a dominating monopoly. The administration of our anti turst laws has been aptly termed as purely "legalistic" with frequently a lack of recognition of the economic conditions. This demand for a revision of our trust laws is well justified. However, a more sober consideration of the present political situation raises serious doubt as to the wisdom of any attempts at anti trust law revision. The latest case in point is the movement to curtail production and limit imports of oil. Here we can clearly see that a restricted program will be legalized only as a corollary to government price control. A revision of our trust laws is therefore more than likely to lead to a system of price control by the Government, which would be a fatal blow to our present system of individualism.

There is no question that the ravages of over competition and ruthless price wars in this country are more damaging to the interests of the individual than is the toll exacted by controlled combinations.

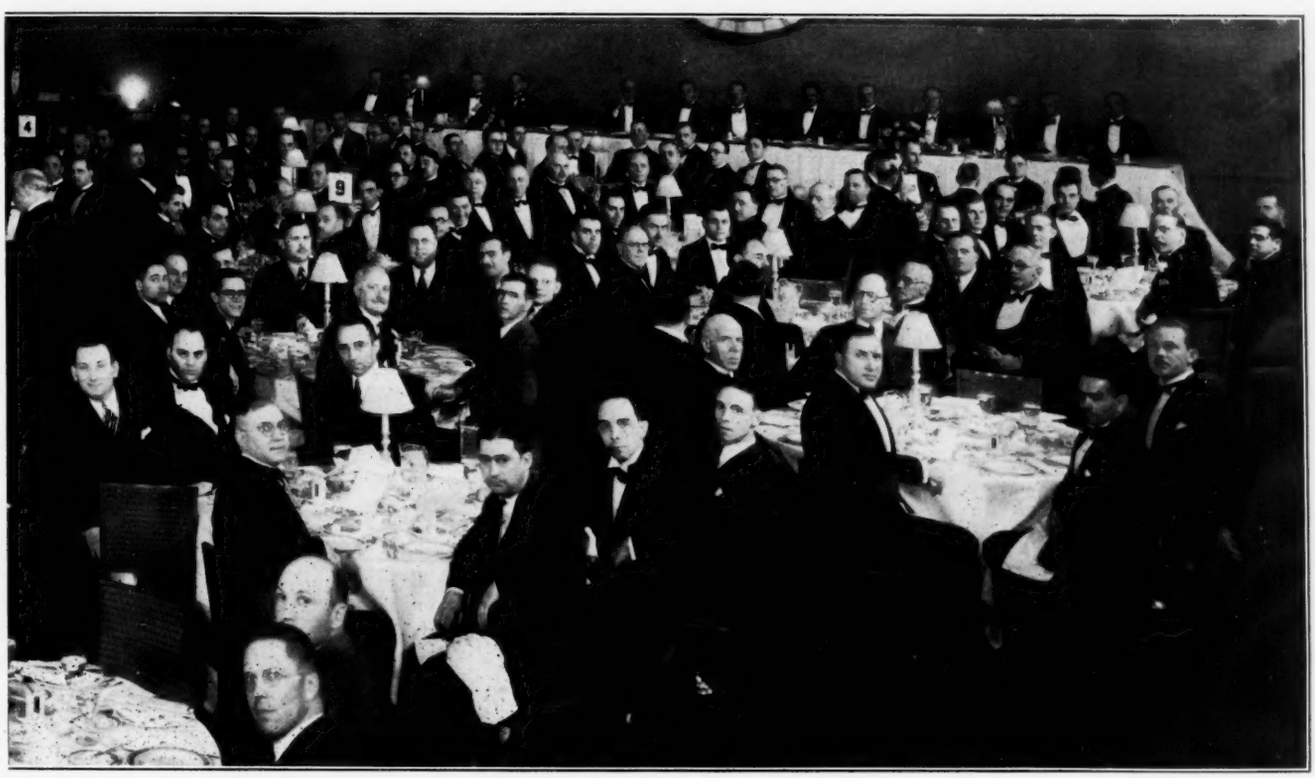
Tariff

Our national bankers and free trade economists have advocated a lowering of the Tariff as a remedy for the world depression. To this I have only one answer, the American market is and will increasingly be the most important market for the products of the American farm and the American factory. How can increased imports of the produce of the foreign farm and the foreign factory reduce unemployment ? I am speaking only from the view point of the American workman, the American farmer and the American business man. I am not concerned with an increased security for foreign loans to be paid for with foreign goods at the expense of our American standard of living.

The Way Out

Every business man that I meet is seriously concerned with a fair and adequate solution of our business problems and you therefore justly ask "What is the way out ?" My answer is there is no way out and never will be a way out until the American business man actively participates in the political activities of our local, state and federal government.

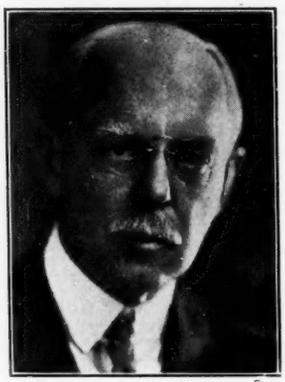
Neither the wild eyed politician nor the demagogue has a remedy. The solution rests squarely upon the shoulders of the American business man, and it will only come when he gives his time and his energy to the solution of the problems of our business and our government which demands immediate attention.



conjunction with the 13th Chemical Exposition, Hotel Roosevelt, May 7

New Research Objectives*

Lower Costs and Greater Consumption



By Dr. Arthur D. Little

INDUSTRY at the moment is apparently in a bad tail spin, and in the resulting dizziness which affects us it is more difficult than usual to think clearly. The underlying causes which are responsible for our present situation are too remote in origin and far too many and complex to permit one like myself to presume to suggest any general remedy. There are, however, two old-fashioned precepts which we can keep in mind, and which seem to be of present application. The first is "A penny saved is a penny earned," and the second reads, "There is a price at which the goods will move." Anything, therefore, that will help industry reach the price at which the goods will move is a definite step toward the revival of prosperity. Since the customers of the chemical industries are the other industries whatever chemical industry can do by research, economy, and management to produce and sell more cheaply is a direct aid and stimulus to industry in general. Now is the time of all others to support and direct research for the better control of processes, the improvement of product, the reduction of costs, and the creation of new markets by finding new uses for old products, new products to create new wants. Necessity is the mother of invention, and many important improvements are made during periods like the present under the pressure of necessity.

There are, nevertheless, some shortsighted manufacturers whose first step toward economy is the discharge of research men. That is as sensible a procedure as putting out the furnace fire because the weather is cold, and it affords their competitors an exceptional opportunity to strengthen their own research organizations by the addition of high grade men. That, I am happy to say, is what we are doing ourselves.

By way of indicating what chemical industry may do to reduce costs let us consider for a moment what it has accomplished.

Aluminum once sold at $90 a pound; the Castner process brought it down to $4, and the Hall process stabilized it around 22 cents.

Some of you will recall that ammonia takes its name because sal ammoniac was once procured by burning camels' dung at the temple of Jupiter Ammon in Egypt. Research has enabled us to do much better today, and while anhydrous ammonia not so long ago was 30c a pound, it may now be had for about 5c.

Ultramarine blue was once made by grinding lapis lazuli, and its value was of an order that might place it on jewelers' shelves. Today it is made chemically and

Public Interest

"The New York Evening Sun" on May 12 commenting editorially on Dr. Little's address said:

"Much of Dr. Arthur D. Little's speech at the Chemical Industries dinner the other night may have sounded platitudinous to the chemists in his audience. . . Discharging the staff engaged in finding new products and materials or new uses for old products, he said, was false economy.

Most of the chemists who heard this advice will agree with every word of it. They would be the first to lose in any general abandonment of research on industry's part. But the loss would not stop there, among chemists out of jobs. Dr. Little was not giving advice to chemists when he urged business men to keep their laboratories busy. He was cautioning executives of manufacturing firms—especially those executives who hold the purse strings of funds for industrial research. Some short-sighted firms curtail such expenditures in slack times.

While not the first to point out the intimate relation between an industry's laboratories and its net profits, Dr. Little for years has been a consistent of advocate wise experimentation. . . Every year some manufacturing plants throw out tons of waste, by-products and obsolete goods, from which valuable materials might be recovered if those plants knew how.

This is not a scientific problem so much as a problem in simple economics. Create a new material, or a new way to use some popular commodity, or a chemical process which will shorten the time for making some article, and the results will add to profits. Today, more than ever before, the economy of such study should be apparent. One of the wisest moves to counteract a decline in sales is to redouble efforts in the laboratory."

*Delivered at the Chemical Industries Dinner, May 7.

is one of the cheapest of our pigments. A very few years ago tertiary butyl alcohol was a laboratory curiosity, and a few cc. cost many dollars; recently it has been sold in tank-cars at 50c a gallon.

Princes once paid $600 a pound for linen dyed with Tyrian purple; now the cost of terabrom indigo in a pound of fabric is a negligible amount because tetrabrom indigo is made in the laboratory instead of by a mollusk.

Rayon, which has contributed so greatly to the resources and profits of the textile industry, sold in its earlier years for $6 a pound; today it is selling at 65c.

These are merely a few illustrations taken at random as they come to mind. Countless others could be cited to demonstrate the extent to which chemistry can aid industry in general in the matter so desperately important at the present time of bringing commodity prices down to the point where the goods will move.

One often hears that the prosperity which we recently enjoyed was largely due to the stimulation afforded by a few great new industries like the making of automobiles, radio equipment, electric refrigerators, and the like, and that what we need now to stimulate business and provide employment for the millions now out of work are more new industries. I know of nothing which holds out better promise of them than intensive chemical research.

Research as a Business Stimulus

If you would know what research can do to stimulate business—your business and everybody's business—let us consider a few of the contributions of research in a single decade.

In 1890 Hall brought out his process for aluminum, and today we have the Aluminum Company of America. In that same year the Frasch process for the recovery of sulfur had its practical demonstration. It relieved us overnight of the Sicilian monopoly and made us the greatest and cheapest producers in the world. In '91 Acheson began the manufacture of carborundum and opened a new era in the abrasives industries. In '92 Willson produced massive calcium carbide, which became the foundation stone for the great Union Carbide & Carbon Corporation with its many subsidiaries and ramifying industries. In '93 the viscose process, to which we owe most of our rayon and all of our cellophane, was discovered by Cross, Bevan & Beadle.

In this year, also, the Schultz process for chrome tanning, which effected a revolution in the leather industry, was introduced in Philadelphia. The following year Le Sueur, a student at Massachusetts Institute of Technology, brought out the first commercially successful cell for the electrolytic production of chlorine and alkali.

The year was again made memorable by the discovery by Rayleigh and Ramsay of argon in the atmosphere. Now we have argon-filled lamps to the profit of industry and the community alike. In '95 Ramsay discovered helium to which today our airships owe their buoyancy and safety. Another contribution of this year was the commercial production of liquid air by Linde, who thus became the scientific parent of the Air Reduction Company.

Still more notable in its reaction upon both science and industry was Röntgen's discovery in '95 of the X-ray, which opened to research vast new and fruitful fields. Another monumental milestone in the progress of science and industry was set up when Becquerel, in 1896, discovered radio activity.

In '97 Twitchell brought out his revolutionary process for splitting oils and fats into glycerine and fatty acids, but the year brought two other contributions of far greater significance: the production of synthetic indigo and the publication by J. J. Thomson of his researches on the properties of the electron. Now the electron is busily at work in many lines of industry. In 1898 Ramsay's continued research culminated in the discovery of neon, krypton, and zenon in the atmosphere. All are now commerical products, and neon flames in red in countless signs designed to bring new business.

The year 1898 was further signalized by the discovery of radium by Madame Curie, a discovery which has had a most profound effect upon chemical and physical theory, and which has revolutionized our concepts of matter.

In '99 Carl Otto Weber began in Manchester, England, the commercial production of cellulose acetate, which is now the basis of a special type of artificial silk, and of new forms of plastics and the non-inflammable movie film.

This fruitful decade was further characterized by the electrolytic refining of copper, the development in Europe of the catalytic process for sulfuric acid, the introduction into this country of the Solvay process for soda manufacture, the invention by Baekeland of velox paper which has done so much to popularize photography as a pastime; and in this decade also occurred the epic development of the Niagara electrochemical industries.

If in one decade the results from research can return such heavy dividends of broader opportunity for business and better understanding and control of the forces and materials with which business works, does not common sense suggest that we make a serious and determined effort to see what research can do for us in this present period of depression and stagnation ? We want new processes and new products. Well, within our easy memory chemistry has given us rayon and cellophane. It has brought the products of the plastics industry from 14½ million dollars in 1914 to over ¼ billion dollars in 1929, and in doing so has doubled the production of phenol and formaldehyde in the five years beginning with 1924. The production of phenol resins went from four million pounds in 1920

to 33 million pounds in 1929. In another five years beginning with 1922 the production of ethylene glycol rose from 10,000 pounds to 12 million pounds. New solvents and new types of soluble cotton have enormously extended the field of lacquers and created new and profitable industries. We have seen the production of synthetic ammonia develop in a few years from nothing to many hundreds of thousands of tons a year. Now we are at the beginning of a new series of developments in chemical industry based on syntheses utilizing water gas and the waste gases of the oil refineries.

What chemistry has done in the past to broaden and stabilize industry and open up new avenues of profit and employment it can do again, provided only that those who are extending its frontiers receive that liberal encouragement and support which their past achievements so richly merit.

Charles Darwin, who during his long lifetime hardly saw a day in which he had the health of ordinary man, left, in addition to his monumental work, a motto which in our present situation is of far greater helpful significance to us than his "Origin of Species." His motto was, "It's dogged as does it," and by way of illustration let me tell you the story of the two frogs.

Through some inadvertence on the part of the farmer who was making up his milk for shipment, two frogs found themselves imprisoned with the milk in one of his great cans. The first frog took a pessimistic view of their desperate situation and said: "There's no help for us. What is the use of attempting to prolong our agony ? This is where I quit." And he sank to the bottom of the can and died. The other frog said to himself, "This is a time for action," and he began to kick, and he kept on kicking, and he kept on kicking, and he kept on kicking, and he kept on kicking, and when in the morning the milk arrived at the receiving point and the can was opened there he was found, sitting comfortably and happy on a great cake of butter!

Association News

The past month was indeed a strenuous one with the Chemical Exposition, The Chemical Industries Dinner, the annual meeting of the American Institute of Chemists, at which the Mellons were presented with the Institute's medal, and the installation of the new officers at the Chemists' Club in New York, and also the officers of the American Section of the Society of Chemical Industry.

The favorable reaction of the exhibitors at the Exposition was as welcome, as it was unexpected. The pessimism of the first two days gave away to a very noticeable wave of optimism before the show closed on Saturday (May 9). Almost without exception exhibiting companies had profited very materially from their participation. A genuine improvement in the elimination of the "Booklet Gatherer" was commented upon and the attendance, a record for recent years was restricted to those who had a very definite interest and reason for coming to the Exposition. It was felt in all quarters that the Show was the most successful one held since those occurring immediately after the War.

Attendance records were broken in the Student Courses and the standard of the papers and interest displayed in them reached a new high peak. Plastics and the newer metals and alloys were easily the features of the Show. Such chemical companies as exhibited set a very high standard and were very well satisfied with the results.

The Chemical Industries Dinner, May 7, at the Roosevelt, was the outstanding social affair of the Exposition Week. Held under the immediate direction of the Salesmen's Association of the American Chemical Industry, over four hundred of the leading executives of the chemical and process equipment industries heard Dr. Arthur D. Little speak on the necessity for maintaining research and E. M. Allen, Toastmaster and President, Mathieson Alkali Co. on national and international conditions affecting business conditions, (both addresses are included in this issue).

Assisting Frederick A. Koch, President of the Association was Ira Vandewater, Chairman of the Banquet Committee, and the following members, Williams Haynes, B. J. Gogarty, Charles F. Roth, Victor E. Williams, Grant A. Dorland and Robert L. Wilson.

At the beginning of the dinner, President Koch read the following letter from The President:

THE WHITE HOUSE,
WASHINGTON.

May 4, 1931.

Mr. Fred A. Koch,
President, Salesmen's Association of
the American Chemical Industry
c/o The Dow Chemical Company,
Lincoln Building,
New York City.

My dear Mr. Koch:

The chemical industries are foremost among those which ally themselves continuously and effectively with workers in science, thereby quickly transforming discoveries of creative, research into practical products for human use. To all industries founded upon research, the Nation and the World look for the advancement which scientific development makes possible for mankind. The comprehensive gathering on this occasion made up of chemists, engineers, industrialists and salesmen symbolizes the close bond so desirable in all industry. In your continued progress I wish you success.

Yours faithfully,
(Signed) Herbert Hoover.

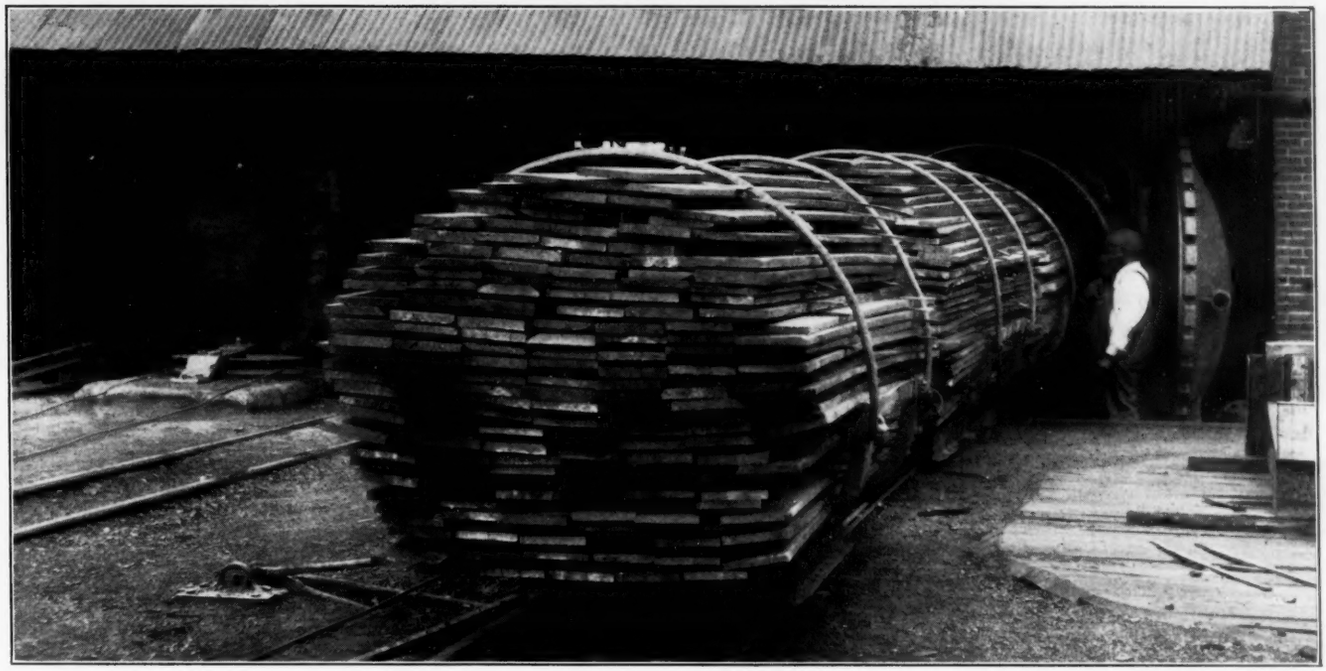
Fertilizer manufacturers and State control officials met at the Hotel McAlpin in New York City recently to discuss the legislative and administrative situation in an effort to obtain uniformity in fertilizer terminology and practices. The conference was called by the board of directors of the National Fertilizer Association.

The Manufacturing Chemists Association, held its annual meeting in the Seaview Golf Club, Absecon, N. J., June 4.

Following this meeting the association joined the Synthetic Organic Chemical Manufacturers' Association in the customary joint annual outing at the Seaview club. The usual union dinner (informal) was given Thursday evening, May 4 with Dr. E. H. Killheffer, president of the Newport Chemical Works, as toastmaster. Senator H. D. Hatfield of West Virginia, was the guest speaker.

The 28th Annual Convention of the American Leather Chemists' Association was held at the Traymore Hotel at Atlantic City, May 27, 28 and 29.

The outstanding event of the meeting was the presence and address—on the afternoon of the twenty-eighth—of Dr. Karl Freudenberg, Professor of Chemistry at Heidelberg University, Germany.



Wood Treatment

An Expanding Chemical Market

A SUCCESSFUL wood preservative must be sufficiently toxic to inhibit fungus growth and insect attack. Fungus growth is a low form of plant life requiring air, moisture, food, and a certain amount of heat for sustenance. Removal of any one of these requirements would stop the growth, but since this is impossible in ordinary construction, the practicable prevention of decay is to poison the food supply of the fungus, which is the wood itself. The success of a good preservative, therefore, depends primarily upon its effectiveness in poisoning this food supply. Generally speaking, a preservative that is toxic to decay-producing fungi is toxic also to insects which attack wood.

Toxicity alone, however, does not determine the efficiency of a chemical for wood preservation purposes. Other factors are of vital importance and must be given equal consideration. It frequently happens that a material may be sufficiently toxic but may lack other essentials and thus be rendered ineffective or impracticable for the purpose. The chemical must be of a nature that will permit proper penetration of the wood; it must be stable under the conditions of exposure to which the wood will be subjected; it must not weaken the fibers; it must not be corrosive to treating plant equipment or the hardware used in construction; it must not be poisonous to workers; it must be uniform in composition; and it must be available in large quantities at a reasonable price. Some of these are operating rather than physical requirements. Nevertheless, they must all be met by any preservative before it can come into general use and be satisfactory to both the wood preserver and the consumer.

Preservatives are of two general classes—oils, which are practically insoluble in water; and salts, which are soluble in water and are injected into wood in water solution. Either type may be used successfully, providing the material properly fulfills the requirements of a preservative. Wood treated with oils is better adapted to certain construction purposes, and that treated with salts is better adapted to certain other purposes, although these fields overlap to some extent. The choice of preservative is, therefore, determined largely by the purpose for which the preserved wood is to be used.

The history of wood preservatives is largely a story of coal-tar creosote and zinc chloride. These are but two of the many ma-

By P. R. Hicks
Manager Service Bureau
American Wood Preservers' Association and National Lumber Manufacturers' Association.

terials that have been tried for preservative treatment of wood, but they are the two that have been more generally used than other materials. They have been found to be most economical, not only in first cost but in cost per year of service. Notwithstanding decades of efforts to discover other effective preservatives, these two were used for the treatment of 98.8 per cent of all timber treated in the United States in 1929. In that year, 226,374,227 gals. of creosote and creosote coal-tar solution were used in the treatment of wood. Of this amount, 134,063,664 gals. were domestic creosote, and 92,310,563 gals. imported. During the same period, 19,848,813 lbs. of zinc chloride were used.

The amount of creosote used to treat wood depends upon the severity of conditions to which the wood is to be subjected and whether marine borers as well as decay are to be combatted. The amount varies from about 6 lbs. per cubic foot to 24 lbs. for piling placed in salt waters where marine borers are present. A minimum of one-half pound of zinc chloride per cubic foot may be specified, but better practice favors from three-quarters to a full pound of the dry salt. This is injected into the wood in the form of a 3 to 5 per cent water solution.

Railroad Initiative

Chemical industry owes the railroads a debt of gratitude for initiating a movement that created a substantial market for the chemicals used for wood preservation. As far back as 1856 a plant for treatment of railway ties with zinc chloride was built. Nine years later another was erected for treatment of piling and construction timbers with creosote. These early plants confined their output to small quantities intended largely for experimental purposes and were soon discontinued, largely because the abundance, general prevalence, and cheapness of timber precluded the necessity for extending the life of timber, and to some extent because of the uncertainty of results that would result from treatment. These early attempts to preserve wood, however, bore fruit and were the nucleus of the large and rapidly growing industry of today.

In about 1875 the railroads began to take the problem of treating timber seriously. Timber treated some years before was now showing the benefit of the treatment, and although timber for replacement was still plentiful, the total cost of replacements over a period of years, including the cost of labor, etc., far outweighed the cost of preservative treatment. Timber preservation may really be said to date from this year. In 1909, the first year for which statistics are available, slightly more than one-half billion board feet of timber were treated. Twenty years later this figure had increased to about 4½ billion board feet. At the beginning of 1930 there were 154 pressure treating plants in the United States, with an aggregate of 356 treating cylinders.

Painstaking research and experimental work was required before wood preservation reached its present stage of development. This experimentation was marked by failures and disappointments as well as successes. Much of this experimental work was concerned with a study of the physical properties of wood, the adaptability of various species to treatment, determination of the proper treatment for the particular purpose, mechanical details of treatment, etc., all of which are of tremendous importance to the wood preserver and to the consumer, but of little direct interest to the chemical industry, except insofar as their successful accomplishment has had a direct bearing on the extended use of chemicals for wood preservation purposes. In this investigative work chemists and wood preservers have worked in close cooperation.

Remaining Chemicals Used

The miscellaneous preservative materials which made up the remaining 1.2 per cent of timber treated during 1929 were patented materials consisting largely of creosote but sold under various trade names, and such salts as arsenic trioxide, corrosive sublimate, sodium arsenite, sodium chloride, sodium fluoride, fluoride-phenol mixture, zinc-meta-arsenite, and a mixture of copper, zinc and phenol dissolved in ammonium.

Many other materials not named above have been tried at various times, among them being sulfate of iron, sulfate of copper, nitrate of silver, sulfate of zinc, carbonate of soda, caustic soda, arsenic compounds, barytes, common salt, quick-lime, soap, resin, vegetable oils, fish oils, essential oils, etc., etc. Almost every conceivable chemical has been proposed as a wood preservative at some time or other, both in this country and abroad. Even prior to the beginning of wood preservation in the United States, British patents contained an astonishing number of chemicals proposed for the purpose. Some of these miscellaneous materials are poisonous to workers. Some are corrosive to metal and hardware. Some are expensive compared with creosote and zinc chloride, and others are inefficient in comparison. Still others are of so recent development that their value or lack of value has not been definitely established.

With the very rapid strides made by the wood-preserving industry in the past ten years, and the increasing popularity of treated wood, there has naturally been an influx of preservative materials recommended or actually placed on the market. Since the actual value of a preservative can not be definitely determined for years after the wood has been treated, the investment of money in timber treated with a preservative lacking service records is something of a speculation. What can be expected of creosote or zinc chloride is established by available records. Other materials may in time prove very valuable, but un-

fortunately the behavior of these chemicals under conditions of service can not be predicted with any degree of reliability.

Considering the greatly increased amount of timber treated in the past few years, and the increased life of the timber so treated and consequently lessened replacements, there arises a question as to whether the success of the wood preserver will not in time defeat his own purpose and whether the wood preserving industry will not in time find itself in the anomalous position of being injured by its own success. If treated wood lasts from three to five times the life of untreated wood, can the market continue indefinitely ? The answer to that question depends upon the ingenuity of the wood preserver in creating new markets for treated wood.

There are many possibilities for treated wood, and their development will have a tremendous influence on the future of wood preservation. Just as markets for treated wood were built up largely by the demands of the railroads for treated ties, so now they are being affected adversely by the lessening demand for treated ties resulting from decreased tie renewals. Many railroads now use only treated ties, and on one railroad tie renewals per year decreased as a result from 336 per mile to 48 per mile in a period of 19 years. That this reaction is being felt in the treating industry is evidenced by the tendency of treating companies originally concerned chiefly with treatment of ties to turn now to treatment of other forms of timber also.

The last few years have seen a very great increase in the amount of creosoted timber used for highway bridges and in the number of creosoted poles used for telephone, telegraph, and power lines. These uses have resulted in a very great increase in the amount of creosote consumed by this industry.

Growing Preservative Demand

Both zinc chloride and creosote are now being used for treatment of timber used in residences, and in other building construction, textile mills, paper mills, factories, etc. This is advisable not only as a preventive of decay, but to prevent the attack of the termite, which is becoming a serious menace in most sections of the country. As a rule, timbers in contact with or in proximity to the ground are treated with creosote, and the sash, baseboards, trim, ceilings, etc., with zinc chloride. It may not be necessary to treat all these members in many locations, but it is safe practice where the termite is very active. In textile and paper mills, where the humidity and temperature conditions are very favorable to decay, roof timbers are commonly treated with zinc chloride and painted white to aid in lighting.

There is a continually growing market for fireproofed wood, mainly for doors, sash, and interior trim in buildings. Wood is preferred by many for these purposes, but to prevent possible fire hazard in large buildings and in congested areas fireproofed wood is coming into demand. A treatment of this kind has been developed, and wood can now be treated so that it actually will not ignite or transmit flame. Until recently this demand for fireproofed wood was confined largely to buildings, particularly in New York City, where large quantities of fireproofed flooring and trim have been used, but interest is developing in its use for general construction purposes, notably for scaffolding. Although unexploited at this time, there exists a vast potential market for fireproofed wood in building construction everywhere, especially for use in farm buildings where fire-protection apparatus is not usually available. This treatment involves the use of salts other than those ordinarily used for preservative treatment of wood, although it is generally recognized that zinc chloride used for this purpose is also fire retardant to a certain degree.

It is apparent, therefore, that there will be no diminution in the use of chemicals for the treatment of wood for various purposes. On the contrary, there is every evidence that this market for chemicals will be increased, not only because the lumber industry and wood preservers are continually broadening the useful field for preserved wood, but because the consumers of wood have become cognizant of the value of wood so treated and are themselves demanding it.

Lewis Chemist Club President

George C. Lewis, President of The Darco Sales Co., and General Manager and Vice-President of L. Martin Co., was recently installed as the new President of The Chemists' Club. He succeeds Dr. L. V. Redman, Vice-President and Director of Research and Development, of the Bakelite Corp.

George C. Lewis

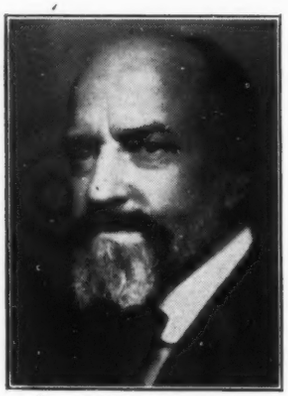
Mr. Lewis' career has been most interesting and varied. Born in Bombay, India, he spent a portion of his life in England. Educated at South Kensington, London, he received advanced diplomas in chemistry, mathematics, and physiology. Presently he went to sea, as a cadet, received his diploma as ship's master, and was thus eventually qualified to lecture on nautical astronomy and navigation. As an officer in the Navy, he participated in the Boer War in South Africa, and in the Boxer uprising in China.

Technically, Mr. Lewis has specialized in the combustion of hydrocarbons, particularly in carbon and lampblack. In addition to the positions cited, he is a director of Columbian Carbon, and technical director of the United Lamp Black Works. He enters his new office at The Chemists' Club with a wealth of experience in club administration. During four years he has been a member of the Board of Trustees and of the Finance Committee. His other club affiliations include The Knickerbocker Yacht Club, British Schools and Universities, and The Uptown Club.

The Vice-President elected for the coming year is Dr. Daniel D. Jackson, executive officer of the Chemical Engineering Department, Columbia University.

The Chemical Expert

By Dr. William M. Grosvenor



THOUGH it may be unwise to talk of what an expert IS, it should be safe to talk of what he OUGHT TO BE. Those experts who happen to read this will recognize themselves truly enough described to approve, in spite of minor errors.

But there is a real reason why the ideal picture should be presented to youth—a better picture than any example can supply. Man may achieve beyond his hopes, but not his ideal. Youth, with its virility, its enthusiasm and its career to plan, is entitled to a better picture, more ideal both in its demands and its rewards; else there can be little of that hope which makes our life worth living; the hope that our sons and our pupils may do better than we have been able to do.

There is no more debasing excuse than "lots of others do it"; no more sure degeneration than to aim at the average standard of achievement. That is far below the capacity of almost any man who will try to do his best. Arrows do not fly higher than they are pointed.

The qualities, an expert should have, depend on his definition, built up of words, and words are but inaccurate symbols of ideas. Clear, accurate thinking deals with ideas and concepts rather than mere words, for words are dual or multiple in character. They shade their meaning as the chameleon does its color; with origin, time, and position. Back in the last century when I learned the words, "O, yes", they had but one meaning. Look at the poor things today. "O yeah!" in refusing a loan or "O yeah ?" in comment on some miracle.

So, it is no surprise to find the expert variously defined. For example, "Liars, damn liars, and experts," or "One skilled in the art of answering all his lawyer's questions and evading all the opponents questions without appearing to do so." Perhaps the classic is the definition of the expert relay. It is said that in the archives of the Patent Office is an application which describes a weird form of telegraphic relay. The inventor knew little electricity and less mechanics. He thought that the longer the moving bar, the more sensitive would be the relay; and that if it were vertically pivoted to swing horizontally, the damping of gravity might be overcome. The Examiner found nothing like it, so he wrote the applicant that the device appeared to be novel and the claims properly distinguished it from the art but, before passing the case to issue, he would like to know why it was entitled "Expert Relay." The answer was: "It is called a relay because it is an instrument for relaying forward telegraphic messages, and it is called an expert relay because it has a long tongue, suspended in the middle and adapted to lie with equal facility in either direction according to the nature of the influence brought to bear."

Yet stop a moment. How often in history has the man who knew more than his fellows, or who understood things better, been called a liar, magician, or lunatic. It may be that all experts are not liars any more than all liars are experts. A court expert is one whose training and experience qualify him to advise the Judge or Jury concerning matters which are beyond the average ken of ordinary mortals.

The question at issue may concern the past. As a chemical instance, what did alum mean to an inventor writing in England in 1893—soda or potash ? A

Dr. Grosvenor has long been recognized as one of the country's leading legal chemists. His investigations and expert testimony have figured in many important patent and other litigations. He speaks with authority then when he outlines the moral, mental, and physical qualities that the aspiring chemist should attain to qualify for the rigorous work of the court expert. His valuable advice, given first to students of Rutgers University, is of considerable interest to the business executive of the industry as well as to the chemist and the student.

whole book has been written on that general subject. Again, how does it happen that a United States inventor in 1888 writes in all seriousness that he dissolved guncotton in ether. Nitrocellulose is not soluble in ether. The expert is supposed to know (or find out) that U. S. P. ether of that date contained about 21% of alcohol and was a perfect solvent. As a homely example, who in the United States but an expert may know a generation from now the meaning of the words "a drink" ?

Or the particular issues in a given case, may determine the answer. When is a substance which is highly soluble, an insoluble agent ? This sounds like a conundrum, but a moment's thought will tell you that when the only part of the substance which functions is the part which is not dissolved and it functions for that reason only, then it becomes an insoluble agent when it is present in excess of its solubility. What is oleic acid ? It may be a fat in the lubricating art because it is used as fat is used to make soaps in compounding grease, or it may be a corrosive acid on brass bearings if present in excess, whereas in the duplicating stencil art it may be an oil replacing castor oil as a tempering agent for nitrocellulose, or may function again as a fat when it is used to make the stencil more friable. Before he testifies the expert is supposed to know, and to know why. Time was when the expression of the export's mere opinion carried great weight. Perhaps it does today, but no man's opinion carries half as much weight for you as your own opinion, provided you are given conclusive reasons why that opinion is correct.

Moral Requirements

When carefully considered, many apparently absurd statements not only become reasonable, but they become in fact the only valid proof with respect to the particular issues in the particular case. In my humble opinion, the worst qualification a court expert can have is to be a skillful liar, for skill requires practice and that creates habit. The expert who even considers lying out of a tight place begins to dig a pit for his ultimate downfall. He is conditioning his mental reactions to seek the easy way that some time will lead into a fatal trap. Expert work is like tight-rope walking over Niagara Falls. A man makes just one serious mistake. Nobody who views the remains, may know, but few will care whether it was deliberate, cowardly or just accidental. The effects are pretty sure to be fatal professionally and not unlikely to be so literally. In my short experience I think I have seen two men go that way and it is a pitiful sight. A man may be so shrewd, quick witted and experienced as not to be caught outright, but judges too are shrewd men with highly trained perceptions. They may first admire, then question and draw their own conclusions. Soon the lawyers question the value of such a witness to their cases.

In the eyes of the law, an expert witness is generally a member of one of the learned professions who because of his professional character and special knowledge is assumed to be friendly to law and justice, to be a "friend of the court" and able to wisely and honestly advise the court and/or the jury. As a friend of the court, he is accorded a certain distinction and certain privileges. He can refuse to answer a question with "Yes," or "No," if it is ambiguous. He can refuse to answer a question without qualification or explanation. He can express opinions. He can even state technical facts beyond his personal experience and knowledge. To the right minded man every privilege brings its corresponding obligation.

The Expert Defined

What manner of man should such an expert be ? For his own good and that of society, for the sake of that respect for law and justice on which civilized society depends, he should have one outstanding qualification—integrity. Not merely in the colloquial sense that he pays his collectable debts and has not yet been caught lying or stealing, but in its philological sense of at-one-ness, in the sense that he is a unified personality, without dual or multiple habits of life or thought. He should thus be free from the fears, uncertainties or hesitations that indicate a schizoid personality of any kind. Thus only can he react automatically, instantly and naturally to any sudden stimulus; in harmony with himself and with his situation. He will tell the truth as well as he knows it because he is true, and guide a court or jury as best his mentality, training and experience permit. When he appears in a case, rest assured that he believes his client has just right to win, and that he sees an honest way to win, no matter how hard or long. Such a man will meet your eye squarely, yet without effort; will admit a mistake naturally, yet without dodging; will be grateful when his attention is called to an error; will deny nothing which he has said, though he may change his mind; and the change, will clearly be made because he wants to make it in the interest of accuracy.

Probably no man has wholly escaped the scars of living, the tender spots where he has been bruised and torn in the struggle, the mental conditioning to fear, the hesitation which of his two or more selves shall act at a given instant. The more nearly he is free from these, the more candid, sincere and likely to be correct —certainly the more impressive and convincing, will be his testimony.

The next most essential quality for the ideal expert is a masterful will directed to self-domination. This does not mean that the man is domineering, or even stubborn—quite the contrary. It means that he has the steady, purposeful self-control by which alone he can hope to do all the things he has to do in the way of

self direction and development. Some of these things may be lightly touched upon.

One is the cultivation of a sound lithe well-coordinated body—the finest that his physical inheritance permits. Modern psychology is teaching us that such training of the body also helps greatly to train the mind. Experience and common sense teach us that physical health, stamina and virility are essential to long hours of driving, concentrated work. Court work is like catching a train; the hardest kind of running *after* it has left is useless. It is no mean test of a man's reserve power to work 36 out of 48 hours for 6 weeks, in the preparation of a case and still be fit to go on the stand. It may be necessary to work all day and all night before going under direct and cross examination at the opening of the case, work straight through the next night in developing further proof of matters in question, go on the stand perhaps all the next day under cross, and be alert, clear and forceful up to the end of that 50 or 60 hours.

Then comes the training of emotions into the most perfect possible subordination to the mind. Otherwise, they may becloud his own judgment and reasoning, or else may interfere with the generous understanding of the other fellow, his virtues and strength as well as his short-comings and weaknesses. It is equally dangerous to overestimate an assistant, or to underestimate an opponent.

He should train himself to the unconscious practical application of psychology for controlling and directing himself with the least strain and lost energy, for the understanding and appraisal of others with the least delay or prejudice, for the guidance of others in physical and mental operations with the least friction and opposition. Perhaps most difficult of all, he should train the ability to do any and all these things unconsciously, so that they appear wholly natural because they have become so, and do not interfere with quick, clear, accurate thinking about the things to which consciousness must be devoted.

Another is the cultivation of the habit of precise, direct, and fearless thinking without dodging or straying. What a task, all by itself! Yet how essential for one who is to guide others in their thinking on which wealth, happiness, and perhaps life may depend.

Clarity of Speech

There is also the training of the mind to simplicity of viewpoint and reasoning, because the expert's thinking is almost useless unless it can be expressed in speech, preferably in short sentences of well-known words accurately applied and connected by a logic which is at once so accurate as to be unquestionable and so clear as to be almost obvious. Common-sense appeals to the hearer immediately it is uttered—it is so rare and simple.

Among the incidental accomplishments of great value to the expert, is the habit of speed writing for taking his own notes on testimony, for use in prompting cross examination by counsel. Another is skill in lip reading, to get what is being said too softly for accurate hearing or by a witness in a noisy courtroom, or by others generally when he is old and deaf. A third is the possession of a quiet, well-modulated voice of great carrying power, and yet of pleasant timbre, with an enunciation that is Parisian in its precision and clarity for instant and accurate understanding.

Is that enough to ask one man to do? More than enough. Far more than I ever hope even to approach. I was over forty before accident first put me on the stand as an expert. But it is a great life if you don't weaken, a joyous process of learning something every day. There are probably few men from whom the wisest can not learn something. One must avoid becoming too old or too self-satisfied to learn. When one ceases to be able to learn with pleasure, that measures the real span of life. After that he begins to die.

You have, perhaps, been expecting to find out what particular branch of science to study for this type of work. I do not know if it makes much difference. You cannot get along without chemistry and physics because they underlie all other sciences and either without the other is a very lame steed. It is not so much a question of what you study, as how you study. When I was going off to boarding school, father asked me why. I said,—"To learn." He shook his head. After leaving me in doubt long enough to impress the answer on my mind, he said: "No, son, you are not going to school to learn in any sense in which you understand it,—not to learn what is in the books or what your professors may be able to tell you, but to educate yourself. The learning is purely one incidental means to that end. What you learn will be in the books and you can look it up when you want it. If you get any education, you will be able to pay someone to look it up for you. If you can get really educated, you will be able to pay people to stand around and know it for you. What you are going to school for—and I hope to college, if you are worth while—is to get acquainted with your mental tools, to form the habit of keeping them clean and sharp and well-arranged; so you can put your fingers on them when you want them, and to acquire by gruelling experience the facility in using those tools with force and precision and dispatch on any material in any direction as long as you want to use them and then—to stop."

CHEMICAL

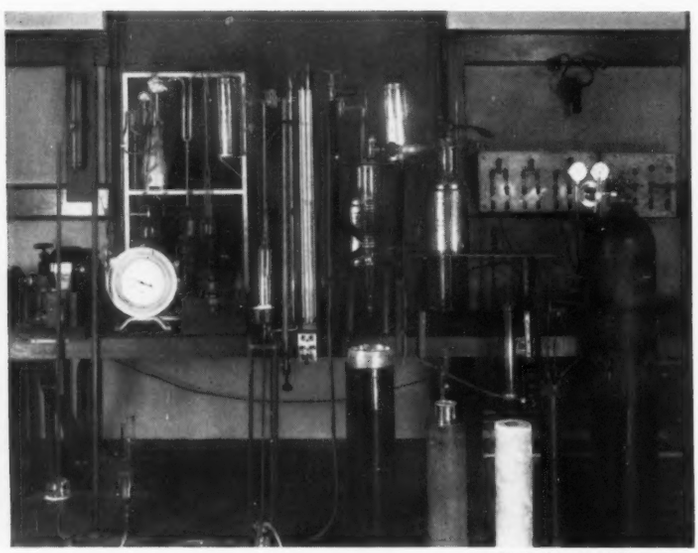
Photographic Record

Keystone

(Left) Secretary of the Treasury, Andrew W. Mellon, and his brother R. B. Mellon (right), receive the annual award of the American Institute of Chemists in ceremonies at Washington, D.C., May 9. Dr. Frederick E. Breithut, president of the Institute, (left), made the awards.

(Right) Luther Martin, 3rd, chairman of the board of Wilckes-Martin-Wilckes Co., division of The Swann Corporation, as president of the University of Pennsylvania Club of New York City, presenting Justice Owen J. Roberts of the U. S. Supreme Court with the club's honor cup.

(Below) In the low temperature laboratory of the National Bureau of Standards liquid helium has just been produced for the first time in the United States, by the transformation of helium gas at a temperature of minus 456 degrees Fahrenheit, or 4 degrees below helium's boiling point.



U. S. Dept. of Commerce

(Below) The airplane joins forces with the fertilizer industry. Spreading plant-food on a rice farm in California. Courtesy Synthetic Nitrogen Products Corp.

What a kick the youngsters would get out of this. Not a toy, but a unit of the very efficient fire department at the Swann Corporation's plant at Anniston, Ala.

NEWS REEL
of Chemical Activities

Chemicals on the Air! The chemical and allied industries have not been slow to adopt the very latest merchandising aid. The "Mike" is learning a lot about chemicals these days. (Right) Recent guest artists of the du Pont Speed Blenders, Annette Hanshaw, Jerry Macy and Ed. Smalle heard over thirty stations during the past month.

(Above) The genial countenance of Charles T. Schermerhorn, who weekly reminds us of the needlessness of rust—Parker Rust-Proof Co. He writes, in connection with the photo, I am reminded of a recent incident. An admirer of my writings wished to see me personally. "Now that you have met me I trust you will be even a greater admirer of my column." "I hope so," he replied, "But something tells me I wish I had not seen you."

(Left) C. E. O'Neal, Vigoro garden expert, who conducts the Swift & Co.'s "Garden Hour" over an N. B. C. network of 19 stations twice a week, and below, the well-known Barrett "Arcadians" to whose tuneful melodies we dial when in need of dance music and who serve to remind us of Barrett Arcadian sulfate of ammonia and nitrate of soda.

SCORES of diversified industries use Merrimac Industrial Chemicals. A reputation for uniformity of product, built up over a period of three-fourths of a century, combined with excellent shipping facilities and recognized prompt service makes Merrimac a logical source of supply. Your inquiries and orders are invited.

MERRIMAC CHEMICAL COMPANY, INC.

Everett Station, Boston, Mass.

Works
EVERETT, MASS.
WOBURN, MASS.

A Division of
Monsanto Chemical Works

Offices
EVERETT STATION, BOSTON
10 E. 40th ST., NEW YORK

POTASH

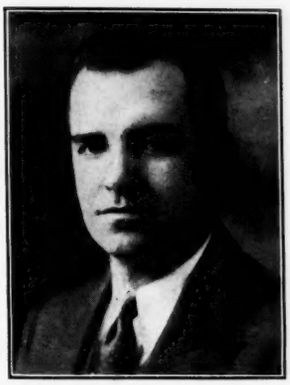
On The Air

By Herbert L. Garrard

AGRONOMIST industries now are using the radio to supplement their regular magazine advertising campaigns, and find the combination very effective. Radio is just one part of a well-rounded educational campaign and proves most profitable when synchronized with magazine advertising, direct mail enclosures, dealer helps and store displays. Radio and magazine advertising are supplementary from the advertiser's standpoint, although in the eyes of business managers of radio stations and printed publications they may seem competitive.

The types of programs, both as to entertainment and commercial announcements over the air, vary considerably according to the result desired. Some advertisers are desirous only of getting their name and that of their product before the public. Others would like a select mailing list of people interested in their product. Inducements are sometimes offered for people to write in regardless of whether direct mail follow-ups are planned.

During the last three years the N. V. Potash Export My., Inc. has used educational radio programs in connection with their Midwest farm paper advertising. It is believed that the radio programs have enhanced the effectiveness of the farm press publicity. The ultimate purpose of our advertising is to increase the consumption of potash salts for agricultural purposes. To increase the demands for potash we have featured the effects of high-potash fertilizers in reducing costs of production per unit, and for maintaining and improving the fertility of farm soils. Both subjects are of timely importance to farmers under present economic conditions.



Fertilizer companies are showing the way to other divisions of the chemical industry in the adoption of the radio as a supplementary medium of advertising. Herbert L. Garrard, Agronomist for the N. V. Potash Export My., Inc., has summarized the salient features necessary for a successful invasion of the realm of the "Mike." His discussion of the experiences of his own company covering a period of three years is well worth the attention of executives of companies now broadcasting or contemplating entering the field.

Farmers should become more conscious of the little-realized fact that crops growing in soil remove large quantities of plant foods. If crops are removed from the field or sold from the farm, and the plant food is not replaced, the soil becomes less and less fertile. Soils of some sections have been robbed of their available plant foods for so long that many unfertile farms have been virtually abandoned. These areas are now termed "marginal lands", and many recommend that they should revert into national forests, etc. This attitude may be sound from a national standpoint, but each individual farmer is necessarily interested in saving his own farm from such a fate. Much of our educational advertising in the Corn Belt for the last two years has aimed at making farmers realize that maintaining the soils of their farms in a fertile, highly-productive state is the first essential of producing crops at a low cost per unit.

The 1930 farm press and radio advertising featured the "Potash Soil Account", stressing the surprisingly rapid losses of potash plant food from soil in different crops of a rotation. In order to stimulate farmers to apply this information to their own farms, we offered to calculate the losses and additions of potash on their farms and send a booklet containing the information if they would fill out the coupon in the farm paper ad. A summary of 220 accounts completed showed an average of 144 pounds of actual potash removed by the crops in their rotations, while only 69 pounds were returned in manure, crop residues and commercial fertilizers. The difference or loss per rotation was 75 pounds, equivalent to all the potash in 150 pounds of muriate

of potash or in 750 pounds of fertilizer containing 10 per cent potash. Copy of the advertising layout and the booklet may be seen at the left of the accompanying cut.

In this campaign a principle was used which is inherent to all good advertising, that of giving information that readers or listeners can apply to their own lives or business. Valuable information was also collected for future use.

Pertinent Figures

In one of the first radio programs this season, Dr. G. N. Hoffer, our Midwest manager, pointed out that $80,000,000 worth of plant food had been inconsiderately mined from the soils of the country in order to produce our surplus of 275,000,000 bushels of wheat. "It would even require 203 freight trains of 75 cars each, each car holding 30 tons, or a single train about 115 miles long, to transport at one time the fertilizer materials needed to replace the plant foods now contained in the 100,000,000 bushels of surplus wheat held in storage by the Farm Board." In addition it would require half as many trains to carry the extra plant foods to grow the plants to produce this government-owned surplus wheat. The total surplus wheat, 275,000,000 bushels, contains about 165,000 tons of nitrogen, 70,125 tons of phosphoric acid and 41,250 tons of actual potash. These figures demonstrate forcibly that the plant food resources of our soils are being mined, and have been for years, in tremendous amounts.

"There is little wonder that from earliest times, efforts have been made to replenish these losses by the use of fish, manure, wood ashes, bone-meal, tankage, various waste products and crop residues. Yet, in spite of all these measures the crop-producing powers of our soils are waning and because of this constant removal of plant foods many fields are becoming increasingly unprofitable. The use of commercial plant foods in this country averages only 40 pounds per acre, and less than eight million tons are consumed annually, a mere item when the total losses in soil fertility are considered."

"FARMER" E. W. RUSK, Director of Farm Service Programs, Station WMAQ, Chicago. Previous to March 1, 1931, he directed similar programs over Station WENR, Chicago. "Farmer" Rusk appreciates the value of educational work by sincere, reliable commercial organizations. He has cooperated with several concerns selling to farmers by conducting educational advertising campaigns on his farm radio programs

The use of fertilizers to reduce the costs of production of crops was another point stressed by many of the speakers on the series of 1931 radio programs. In one talk the writer called attention to the farmers in the Ohio 100-Bushel Corn Club, who in 1928 produced corn at 22 cents per bushel if they raised more than 120 bushels per acre. If they raised less than 70 bushels per acre it cost 38 cents, or 16 cents more per bushel. In the 1929 Indiana Five-Acre Corn Contest similar results were found. Those producing 90 to 1000 bushels per acre produced corn at 29 cents per bushel, while for those raising less than 60 bushels per acre it cost 15 cents more per bushel. If all corn was sold at the same price those growing the larger yields received a double profit, with more bushels to sell and more profit per bushel.

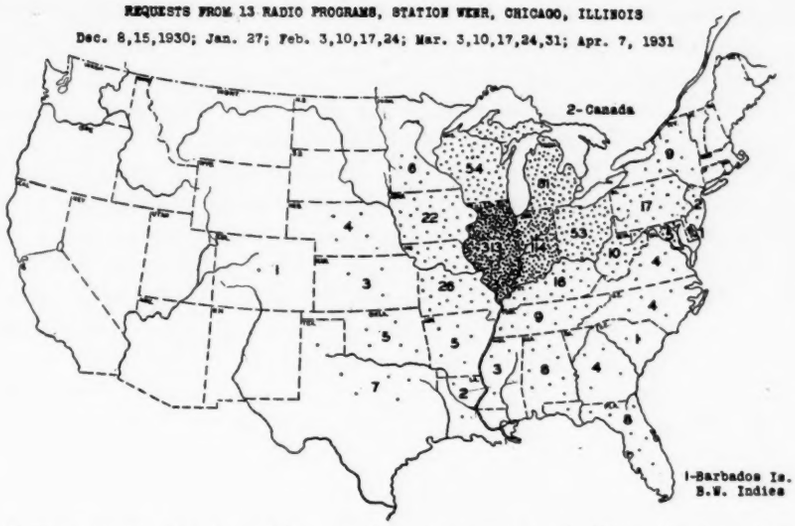
Guest Speakers

Authoritative information in talks by well-known authorities from Midwestern agricultural colleges added much to the radio programs. These guest speakers chose their own subjects on some phase of soil fertility.

Dr. O. H. Sears of the University of Illinois gave his recommendations for the application of muriate of potash to improve high-lime or "alkali" soils which occur especially in northern parts of Illinois, Indiana and Iowa. He also stated that the need for potash salts appears to be developing on many other soils, and is usually associated with the repeated growing of sweet clover or other legumes.

Prof. George M. Gran-tham of Michigan State College advised the use of phosphate-potash fertilizers like 0-20-20 (N-P-K) for alfalfa on sandy soils. Proper fertilization largely insures against winter-killing of alfalfa and sweet clover by heaving.

Prof. C. J. Chapman of the University of Wisconsin stressed the importance of efficient production of farm crops. A larger acreage of alfalfa was advised for Wisconsin farms. Lime, phosphates and potash are helping more farmers to increase production per acre at lower cost per unit. The 1930 fertilizer tonnage in Wisconsin increased 25 per cent, while the potash



Scatter diagram showing relative numbers of requests for fertilizer literature from different territories, in response to agricultural radio programs

content of that fertilizer increased 48 per cent over 1929.

Prof. A. R. Albert, in charge of the Hancock-Coddington Branch Experiment Stations in Wisconsin, summarized their experiments on the effects of potash and lime combinations for legumes and succeeding crops in the rotation on sandy soils of the central part of the state. Many clover and alfalfa stands starve out first and freeze out later. For alfalfa he advised the use of phosphate-potash fertilizers on sandy soils at seeding time, followed by topdressings of 200 to 300 pounds of muriate of potash or an equivalent amount of 0-9-27 fertilizer every two or three years.

Prof. G. P. Walker of Purdue University Agricultural Experiment Station summarized the returns from fertilizers as shown at various state experimental farms throughout Indiana. Comparatively small investments per acre for fertilizer returned very profitable increases of corn, wheat, soy beans, hay and potatoes. He said, "Low prices for farm products demand the strictest economy in crop production . . . . .

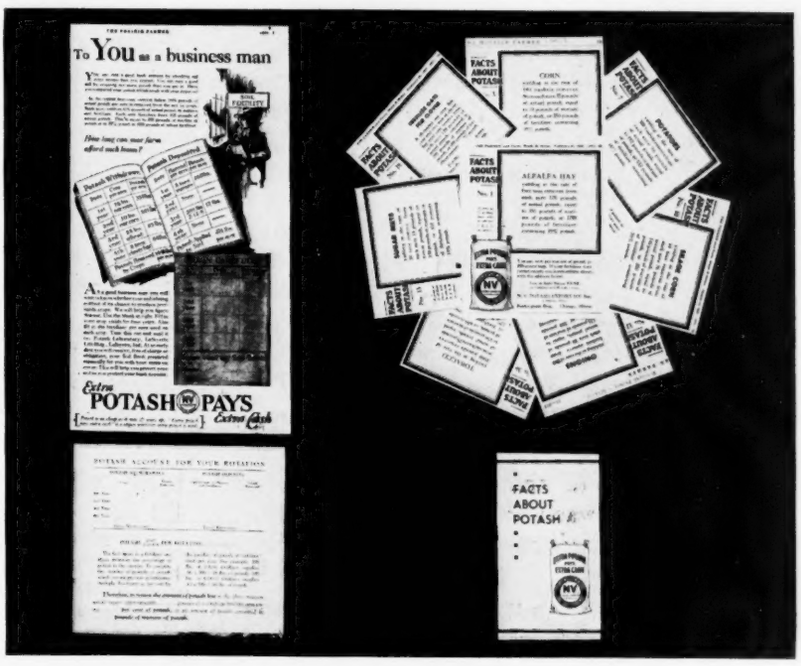
The farmer who stays ahead is the one who produces his crop at low cost."

Mr. R. V. Tanner, a farmer from Jackson County, Michigan, gave a radio talk and told how he had rebuilt the fertility of his farm. He has conducted cooperative fertilizer experiments on his farm and found that lime and high potash fertilizers assure large yields of red clover, alfalfa or sweet clover. It took him a number of years to find the reason for a well-known fact,—that hardwood ashes are magic in securing stands of clover. They do it by virtue of the lime and potash which they contain. He also uses complete fertilizers for corn and small grains.

The latest information on the best methods of fertilizing corn was given by Mr. Ove F. Jensen, Assistant Director of Soil Improvement Work, of the National Fertilizer Association, Chicago. Recent experiments in many states have shown that application of fertilizer in the hill or row for corn, but at a safe distance from the seed, gives most efficient results. Farmers, the fertilizer industry and farm machinery manufacturers are all very much interested in these new developments.

Vivid descriptions by Mr. I. J. Mathews, one of the representatives of this company, took the audience on radio excursions to three farms over the Midwest where other representatives have conducted fertilizer demonstrations. One story told how Mr. B. F. Larkin, president of the Missouri Vegetable Growers Association, found that 640 pounds of a 4-8-12 fertilizer increased his yields of potatoes from 233 to 335 bushels per acre, at a net gain of $63.22 per acre after fertilizing costs were paid. They also found that potatoes grown with high-potash fertilizers made superior quality potato chips. On the Northern Montcalm Potato Farm of Fred W. Johnson and Son, near Edmore, Michigan, another demonstration showed that 3-9-18 fertilizer was most

Layout of Midwest farm paper advertising of N. V. Potash Export My., Inc., for 1930, left, and 1931, right. Booklets sent out in response to requests are shown below



profitable for potatoes there. Mr. Johnson uses a unique and profitable method of marketing his extra quality potatoes in 15-pound cartons, so both quality and yield are very important to him. Another account by Mr. Mathews disclosed how Mr. G. Harris and his son Harold of near Bellefontaine, Ohio, have found, after growing alfalfa on their farm for 37 years, that they can increase the yields and quality of alfalfa hay by topdressing the crop with phosphate-potash fertilizers.

The numbers of requests from radio listeners for literature, copies of radio talks or other information regarding fertilizers, are shown on the accompanying map. This number of requests from the radio advertising may seem rather small to some advertisers. However, our programs and announcements were designed to bring requests from only those interested in the use of fertilizers. Copies of educational literature were the only things offered as inducements to write. These inquiries are in addition to those received from farm press advertisements entitled "Facts About Potash". On many of the radio programs the audience was invited to read the advertisements then appearing in their farm papers. These advertisements, featuring removals of potash from soils by crops, also contained an invitation to "Tune in Radio Station WENR, Tuesdays at 6.45 c.s.t." (Copies of the ads and the booklet "Facts About Potash" are shown to the right of the accompanying illustration.) This tie-up of the two types of advertising seemed to be very effective, judging from the request letters, although no positive check was possible.

A study of the scatter map and corresponding facts about each program discloses some interesting facts about their effectiveness. The large number of requests from Illinois is probably due to several causes. Station WENR is a favorite of Illinois farmers. Also there is an increased interest in potash for Illinois soils this season. Requests from outlying states indicate that Station WENR may be heard a long distance, but many farmers there apparently have other favorite stations. This fact emphasizes the importance of selecting stations which have established audiences, whether for separate or for chain programs.

The requests received from different programs show the necessity of making it easy for listeners to get the names and addresses of the firms and any products named. The largest response received from any single program came when we offered various booklets on fertilizers for different crops, designating the booklets by numbers. Each circular was described in general, and given a number, and the listeners had been told previously that all that was necessary to get the booklets desired was to put these numbers down on a postal card or letter and send to POTASH, Buckingham Bldg., Chicago, or to Station WENR.

When planning a radio campaign the selection of stations which cover the territory desired is the first prerequisite. Experienced program directors who understand what effects the client desires are also important. The selection of entertainment will depend on the type of program wanted. It is often more profitable to select talent who already have established a reputation, thus capitalizing on their radio audience. It may be wise to build a program around a personality or a group. If outside personalities are introduced in the program for the educational features, they should present only reliable, timely and practical information. Indirect advertising has been found to be the most effective type.

According to the radio program directors all radio advertising should adhere to certain principles. It should be entertaining to attract listeners; be instructive and timely to hold their interest; be authoritative to gain confidence; and be coordinated with all other types of advertising and publicity. They point out further that a large proportion of entertainment on radio programs is as effective as plenty of white space in printed advertising.

Educational campaigns are sometimes more effectively presented by radio than by printed advertising. By more intimate contacts of radio personalities, it is possible to humanize the advertiser's message. When a prospective consumer is in a respective mood by virtue of pleasing entertainment, the educational story is more easily accepted. Also one can convey in a few seconds by the human voice a story which would take several minutes for a reader to get from a printed page. The spoken word is more effective because it seems more sincere, and word pictures and ideas are impressed which are not easily forgotten. The next time anyone hears or sees anything in reference to the product mentioned, he will unconsciously pay more attention to it. The owners of radio receiving sets from a financial standpoint are on the average the greatest potential group of prospective buyers of products advertised.

Chemical Salesmen's Golf Dates

Four golf outings have been planned for the coming season for the members and guests of the Salesmen's Association of the American Chemical Industry. The outings are scheduled for June 23, July 22, August 18, and September 15.

The first tournament on June 23 will be held at Canoe Brook Country Club, Summit, N. J. The charge for this will be $8.00 for members, and $10.00 for guests including everything—greens fees, lunch, dinner, tips, and prizes. If dinner is not planned on, $2.00 can be deducted. This tournament will be under the direction of Grant A. Dorland, MacNair-Dorland Co., and Robert L. Wilson, Dow Chemical Co. Entries must be made to Mr. Dorland at 136 Liberty St., New York, by noon, June 22.

The Chicago Rubber Group held their Annual Meeting on Friday, May 8th, at the Steuben Club, Chicago. Election of officers for the year 1931-1932 was held, and the following were chosen to guide the organization: Mr. L. J. D. Healy, Consulting Chemist-Chairman, W. H. Parker, Chief Chemist, Featheredge Rubber Co., Vice-Chairman; B. W. Lewis, Wishnick-Tumpeer, Inc., Secretary-Treasurer.

Acetic Acid from Acetylene

A Review of the Present and Proposed Processes

By Chas. E. Mullin, D.Sc., F.A.I.C., F.T.I.

and

Howard L. Hunter, Ph.D., B. Chem.

This is the first of a series on the synthesis of acetic acid. We believe the four articles comprising the group to be the most complete report on the subject yet to be published in the English language and a very valuable contribution to the literature as well as a survey of the question from the economic or commercial viewpoint. The authors, Doctor Chas. E. Mullin and Doctor Howard L. Hunter have been closely associated with the growth of the synthetic acetic acid industry in this country and abroad and therefore speak with authority.

DEVELOPMENTS in synthetic organic chemistry have entirely revolutionized many industries and, in fact, organic chemistry itself. It would have been impossible a hundred years ago, when Wohler synthesized urea, to visualize these developments and their results. Until recently, wood distillation was the only source of of commercial methanol, and the principal source of acetic acid. The acetic acid was synthesized first, but at a cost considerably above that of the distillation product. The production of synthetic acetic acid received its first great impetus during the World War, when demand in enormous quantities and at any cost arose for the manufacture of acetone. Synthetic acetic acid plants were built in Europe and America, and a great deal of acid produced. These plants will be discussed later.

After the war, research lowered the cost of the synthetic processes so that in many cases, particularly where pure and concentrated acid is desired, it is now cheaper to manufacture synthetic acid than to purchase the distillation product. More recently, synthetic methanol has been produced at a cost far below that of the distillation methanol, so that the future of the wood distillation industry is rather problematical.

Due to the constantly increasing demands for acetic acid, its synthesis is receiving great attention from scientists in all parts of the world, so that we may expect new or improved processes, and lower production costs, in the future. As a rule, synthetic chemicals have the advantage in the matter of purity, over the older or natural products, and acetic acid is not an exception to this rule, so that the synthetic product has some advantages for certain uses. At the same time, acetic acid is meeting considerable competition in some industries from synthetic formic acid, which is now produced in a very satisfactory quality at a low price.

Professor of Chemistry, Rayon and Dyeing, Head of the Division of Textile Chemistry and Assistant Professor of Chemistry, Clemson College, S. C.

Early Patents and Literature

Acetic acid was first synthesized in the early part of the nineteenth century, but the method was of no industrial importance, due to the high cost, at that time, of the metallic sodium and other reagents used. It was only in 1907 that a commercially practicable process was developed. This process was based upon the previous patents of Jonas, Desmonts, Deglatigny and Dubose, and was the first of many developed for the preparation of acetic acid synthetically from acetylene.

The process of Jonas, Desmonts, Deglatigny and Dubose consisted of passing acetylene into a solution of a mercuric salt, to form mercury acetylide, which is precipitated. Upon heating a solution of the acetylide to boiling, the salt is decomposed, liberating acetaldehyde and regenerating the mercuric salt. The acetaldehyde is oxidized to acetic acid, either with or without the aid of a catalyst.

The next advance was the process developed by Grunstein and the Chemische Fabrik Griesheim Elektrom during the period 1910 to 1912. In this process the solution of the mercuric salt is acidified with sulfuric or other acids, and the absorption of acetylene occurs in an atmosphere of this gas, in order to avoid, as far as possible, the polymerization of the aldehyde formed. The oxidation of the acetaldehyde is facilitated by the presence of acetic acid or its chlorine derivatives, acetic anhydride, or their

homologues. In 1912 the Lonza Company erected a plant at Vallese, Switzerland, to manufacture acetic acid and acetic anhydride from acetylene by practically the same process as that covered by the above Griesheim-Elektron patents.

During the period between 1911 and 1916, the Consortium fur elektrochemische Industrie was granted six patents in various countries, covering the oxidation of acetaldehyde to acetic acid by different methods, with and without various catalysts, the source of the aldehyde being acetylene in each case. About the same time, the different large German dyestuffs manufacturers now constituting the I. G. Farbenindustrie became interested in the subject and were granted a number of patents. The Farbenfabriken vorm. F. Bayer und Company was granted seven patents covering various methods of oxidizing acetaldehyde by means of oxidizing solutions, electrolytically, in the presence of kieselguhr, and mercury sulfate. The Badische-Anilin and Soda-Fabrik received two patents, and Meister, Lucius and Bruning was granted five patents, all along somewhat the same lines. Their interest then appears to have lagged somewhat, probably at least in part due to the war, until about 1927. Since this date numerous patents have been granted to the I. G. Farbenindustrie. These will be discussed later.

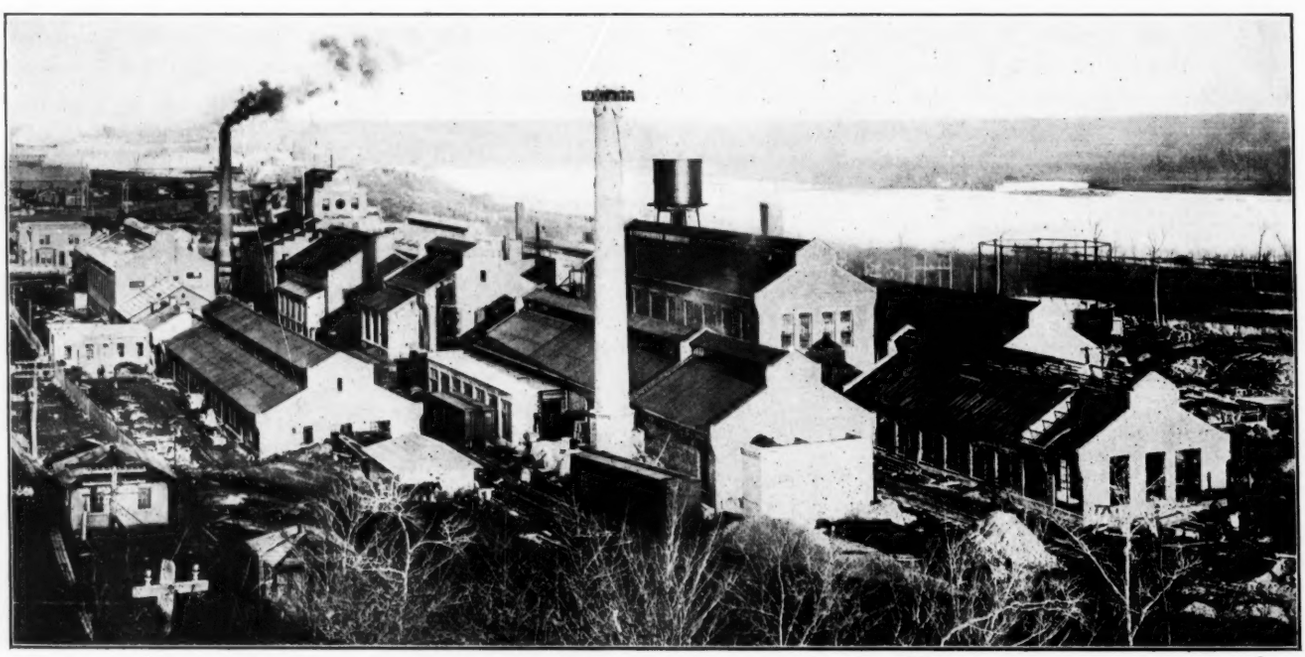
Dreyfus' Improvements

In the synthesis of acetic acid by the Griesheim-Elektron process and patents, as discussed above, several difficulties or objections are encountered. In the presence of air, the absorption of acetylene is retarded, but this can be overcome by working in an atmosphere of acetylene. However, there still remains the necessity for mechanical agitation in order to accelerate the absorption, the loss of aldehyde by polymerization, and the necessity of recovering the mercury salt from the solution used. Also, the formation of the acetaldehyde, and its subsequent oxidation to acetic acid, must be conducted as two separate and distinct operations.

In 1914 Dreyfus patented a modification of the above procedure which eliminated many of the previously mentioned difficulties. By substituting a strong solution of acetic acid for the dilute solution of sulfuric acid, he accelerated the absorption of acetylene, thus eliminating the necessity for mechanical stirring. Furthermore, the subsequent oxidation of the aldehyde to acid could be carried out in one operation by this process.

The Dreyfus interests built three large plants in England, France and Italy, during the early part of the war, for the preparation of acetic acid, acetic anhydride, and alcohol, from acetylene, according to the above process. Although these plants were not very successful financially, it is believed that the process was not at fault.

Since the war, the Dreyfus interests, through British Celanese and other companies, have continued their interest in synthetic acetic acid and acetic anhydride, probably largely due to their interest in very pure acid and anhydride at a low cost for the manufacture of synthetic yarns and other purposes. Judging from the number of patents granted to this group, they are probably the most active and agressive group of researchers in this field. The various Celanese companies in different parts of the world manufacture their own synthetic acetic acid and anhydride for their needs.



One of the two synthetic acetic acid plants on the North American Continent now operating

Feuchter's Process

In 1914, Feuchter announced a new method of synthesizing acetic acid from acetylene. This process consisted of absorbing the acetylene in a fused mixture of sodium and potassium hydroxides at a temperature of 220° C. Hydrogen is liberated during the reaction, and treatment of the reaction mixture with water gives the alkali acetate. A yield of 60 per cent of the theoretical was claimed. Apparently the high cost of the alkali outweighed any advantages of this process as no further developments of this method have appeared in the literature.

American Acid Manufacture

Due to the use of calcium carbide for the manufacture of the acetylene utilized for the preparation of the acetaldehyde used in practically all of the former processes for the synthesis of acetic acid, it is not surprising that the Union Carbide Company should have become interested in the manufacture of synthetic acetic acid. This appears to be the first American company to receive a patent in this field. Soon afterwards the Canadian Electro-Products Company took out a number of patents in various countries, covering the oxidation of acetaldehyde to acetic acid.

The Canadian Plant and Process

During the latter part of the war, the Canadian Electro-Products Company, Ltd., erected two plants at Shawinigan Falls, Quebec, Canada, for the production of synthetic acetic acid. These plants were closed after the war, due to the decreased demand for acetic acid. Each installation had a capacity of 700 to 800 gross tons of glacial acetic acid per month. Between 500,000 and 600,000 cubic feet of acetylene were generated each day by the reaction of calcium carbide with water. The gas was converted into acetaldehyde by passing it into dilute sulfuric acid containing mercuric oxide, held in suspension by vigorous stirring. The oxide was fed into the vessel continuously and the aldehyde removed by means of a large excess of acetylene. The mercuric oxide was prepared by the electrolysis of a caustic soda solution in shallow silicon-iron alloy vessels, a layer of mercury resting on the bottom of the vessel serving as the anode. The oxide was removed as formed, by sweeping off the surface of the mercury with a stirrer.

The oxidation of the aldehyde was conducted as a separate process in aluminum vessels by means of atmospheric oxygen in the presence of a suitable catalyst. The product consisted of 98 per cent acid and contained very few impurities. One distillation of this product gave a 99 per cent pure acid.

Scandinavian Developments

On account of the abundance of cheap hydroelectric power in the Scandinavian countries which may be utilized for the production of calcium carbide, it is probably possible to produce this compound there at a lower cost than in any other part of the world. This would, of course, account for the interest of these countries, which are not large consumers of acetic acid, in its manufacture.

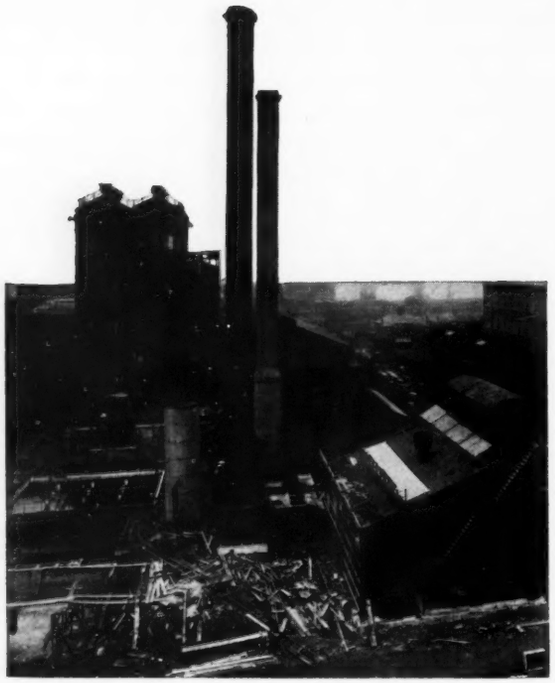
Early in 1918, the Aktie Selskabet Karbidindustri was founded in Frederickstad to manufacture acetic acid and alcohol by Utheim's process and patents. The original plant erected had a capacity of only 100 kilograms of acetaldehyde daily but it was planned to increase this to about 3,500 or 4,000 kilograms daily. Utheim received four patents covering the oxidation of acetaldehyde in the presence of a solvent, but without a catalyst, in small quantities in small, narrow silver or aluminum reaction chambers under pressure, as well as the hydrolysis of acetylene in the presence of mercury compounds and oxidizing agents, in the presence of metals of the iron group.

In 1926 and 1927, patents were granted to the Stockholm Superphosphate Company, a Swedish concern, for the manufacture of synthetic acetic acid, from acetylene by a two-stage process. The new feature of this method was the oxidation of the acetaldehyde in an upright tube filled with small pieces of solid inert material, in order to avoid danger of explosions. A heating jacket was arranged around the lower part of the reaction tube to remove the acetaldehyde from the acetic acid formed. The upper part of the tube was surrounded by a cooling condenser. The catalyst was dissolved in acetic acid and introduced at the top of the reaction chamber and the oxygen was run in at the bottom. The acid was removed from the bottom of the chamber.

Recent Research

In 1920, Neumann and Schneider conducted some laboratory experiments to determine the optimum conditions for the reactions occurring in the most widely used processes for the synthesis of acetic acid from acetylene. They found that the best results in the formation of the aldehyde were obtained by running acetylene, with vigorous mechanical stirring, into a 96 per cent acetic acid solution containing three per cent of mercuric sulfate. The temperature should be about 30° C. A 90 per cent of theoretical yield was obtained under these conditions. At 40 to 50°C. the rate of absorption was actually greater, but the yield of acetaldehyde was reduced to 70 or 80 per cent. Using a dilute sulfuric acid medium instead of acetic acid, the reaction was found to be more erratic and even at the optimum temperature of 25 to 30° C., only 70 to 75 per cent yields were obtained. Higher temperatures resulted in a considerable decrease in the rate of absorption and an increase in the formation of polymerized and resinous by-products.

The best results in the one step conversion of acetylene into acetic acid were obtained by using the



England has but recently completed a new synthetic acid plant

above-mentioned mercuric sulfate-acetic acid catalyst with the addition of vanadium pentoxide. The acetylene and oxygen were introduced alternately. Yields of acetic acid as high as 83 per cent of the theoretical were obtained by this process.

One of the most recent series of experiments on the synthetic preparation of acetic acid was conducted by Pascal in 1926. He studied in detail the conversion of acetylene to acetaldehyde by a continuous process using a two per cent solution of mercuric sulfate in an acid medium and found that increasing the temperature increases the speed of the reaction, facilitates the elimination of the acetaldehyde, and tends to preserve the catalyst from too rapid reduction. On the other hand, it reduces the solubility of the acetylene and causes the formation of more paraldehyde. He finally concluded that it was advisable to use a temperature of 75° C. or less. With an iron-mercury catalyst, the best yields were produced by using two mols of ferric sulfate per mol of mercuric sulfate. He also found that zinc salts, in the absence of iron increased the speed of reaction but produced a more rapid deadening of the catalyst. In the use of a ternary catalyst consisting of mercury, iron, and vanadium, the following proportions were found most efficient; 1 part Fe^{+++}. 1 part Hg^{++}: 0.1 part V^{+++++}. Pascal oxidized the acetaldehyde by agitating a 10 per cent solution in acetic acid at 50 to 55° C. in the presence of a catalyst consisting of 0.3 per cent of copper permanganate. This catalyst was suggested in British Patent No. 124,194, to the Societe des Acieries and Forges de Firminy.

In 1924 Reif determined the purity of the synthetic acid prepared from acetylene in order to determine qualitatively and quantitatively the impurities introduced by the catalyst, or from secondary reactions. The "chemically pure" acid samples which he examined contained no mercury, manganese, vanadium, arsenic, sulfate, or phosphate, but traces of iron were found. These and other analyses indicate that the synthetic acid is of a much higher degree of purity than the products obtained from wood distillation. In most cases the impurities present in synthetic acetic acid are designated by the manufacturer.

Latest Patent Developments

The two industrial concerns most active in recent years in patenting processes for synthetic acid manufacture from acetylene, are the I. G. and the Imperial Chemical Industries. The patents granted to the former company have been rather diversified as to the nature of the processes used. One new feature of these patents deals with the older method of passing acetylene into a solution of a mercuric salt, but it provides that ammonium salts, such as the sulfate, be added to prevent the precipitation of sludge and to prolong the activity of the catalyst. Several of the patents cover the passage of a mixture of acetylene, hydrogen and air over catalysts, preferably vanadium compounds, at temperatures in excess of 100°C.

Two views of the new plant of the Distillers Co. Ltd., at Hull, England

One of the latest I. G. patents covers a recent development in which acetic acid and acetaldehyde are prepared by passing a mixture of acetylene and steam over suitable catalysts, such as vanadium or tungsten compounds, at temperatures ranging from 100 to 400° C., depending on the specific catalyst employed.

The late patents of the Imperial Chemical Industries are in many respects similar to some of the I. G. patents, just described. The reaction is carried on in a tower, the acetaldehyde vapor, mixed with air or oxygen, being fed in at the bottom, and a catalyst dissolved in acetic acid introduced at the top.

At the present time it appears that most of the commercial synthetic acetic acid upon the market is manufactured from acetylene or acetaldehyde. However, an examination of the most recent patents shows that synthetic processes are being rapidly developed in which such substances as methane, carbon monoxide, ether, etc., are the basic materials, rather than acetylene, and these will be discussed in a succeeding paper.

The patents covering the manufacture of synthetic acetic acid from acetylane will be reviewed in the next paper by the same authors.

Mellon Brothers Honored

The presentation to Andrew W. Mellon and Richard B. Mellon of the medal "for noteworthy and outstanding service to the science and profession of chemistry in America" was the principal event in the day's program of the Annual Meeting of The American Institute of Chemists at the Carlton Hotel, Washington, on May 9th. The medals were presented by Dr. Frederick E. Breithut, President of the Institute, immediately before a luncheon at which many noted industrialists, educators, and chemists were gathered to honor the Mellon brothers as the friends and benefactors of industrial research and American chemical progress.

E. R. Weidlein
Mellon Institute Director

Dr. Breithut commended the medalists for their vision and foresight in establishing Mellon Institute of Industrial Research eighteen years ago "when chemistry was regarded by most industrialists as a step-child rather than a blood relation." He expressed the hope that more men of means would follow their example, so that more concerted efforts may be made to bridge the gap between capitalists and technical men. He also spoke of the moral and financial support which the Mellon brothers have given to the establishing of the National Institute of Health.

In accepting the medal, Mr. Andrew Mellon expressed his own and his brother's deep appreciation of the joint honor conferred on them, characterizing it as a symbol of approval of what they have tried to do for public health and industry, and for the great profession of chemistry. He paid high tribute to the late Robert Kennedy Duncan who originated the Industrial Fellowship System; and to Edward R. Weidlein, present director of Mellon Institute, for his further developments in practical methods of co-ordinating business and chemical industry.

The Society of Chemical Industry, American Chemical Society, American Electro-chemical Society and the Societe de Chimie Industrielle held a special meeting on May 8, in conjunction with the Exposition at which the following papers were presented. "Solvents from the Petroleum Industry" by James G. Park, Stanco, Inc., and "Solvents from the Gas Industry," by Dr. Charles R. Downs, Consultant, and a member of the Advisory Board of Editors of CHEMICAL MARKETS.

The Willard Gibbs Medal of the Chicago Section of the American Chemical Society was presented to Dr. Phoebus A. Levene of the Rockefeller Institute for Medical Research, New York, before a national gathering of scientists at the Steuben Club, 188 West Randolph Street, Chicago, on the evening of May 22.

The following elections were made at a meeting of the Executive Committee of the American Section of the Society of Chemical Industry on May 8th, 1931. Chairman, Allen Rogers; Treasurer, F. C. R. Hemingway; Secretary, Foster D. Snell. New members of the Executive Committee: William Gesell, Robert J. Moore, Arthur Singmaster, Irving Hochstadter, Benjamin T. Brooks.

Bookshelf

Secondary Aluminum, by Robert J. Anderson, $10, bxd., 550 pages, published by Sherwood Press, Inc., Lakewood Branch, Cleveland, O.

A text and reference book on secondary and scrap aluminum, their metallurgy, technology, raw materials, production, economics and utilization.

Business Adrift, by Wallace Brett Donham, $2.50, 165 pages, published by McGraw-Hill, N. Y.

An attempt to point out the basis of rationalization to which business must turn to develop a method of approaching complex domestic and world-wide social problems so that they may come under control.

The Vitamins, by H. C. Sherman and S. L. Smith, $6.00, 575 pages, published by The Chemical Catalog Co. Inc., N. Y.

A revised and up-to-date edition of this work on the chemical nature of vitamins that summarizes a large amount of material on the subject.

Artificial Silks, by S. R. & E. R. Trotman, $7.50, 274 pages, published by J. B. Lippincott Co., Phila.

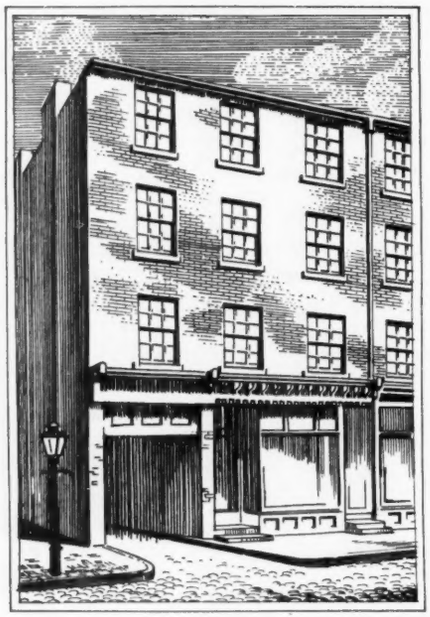
A book by a British authority, which describes the manufacture, properties, bleaching, dyeing and finishing of the different kinds of commercial artificial silks from a chemical viewpoint.

Regenhardt's Geschaeftskalender fuer den Weltwerkehr, 1931, published by C. Regenhardt A. G., Berlin N. 24., Germany, price RM. 11.00.

Whoever is interested in international business should not fail to possess this very valuable reference book. Its scope is world-wide and the handy volume contains reliable data, such as sources of credit information, addresses of collection agencies, commission houses, banks, law firms, forwarding agencies, traffic institutions, and other practical information. The present 56th edition has been newly revised and enlarged by 60 pages.

Die Chemische Industrie des Deutschen Reiches 1930-31 Compiled and edited under collaboration of representative chemical societies, published by Verlag für Börsen-und Finanzliteratur A. G., Berlin, Germany, 900 pages, clothbound, price RM. 25.00.

This directory on the chemical industry of Germany appears after a number of years in its seventh completely revised and greatly enlarged edition. It brings again: the biographies of all important chemical manufacturing enterprises, to which 200 new firms have been added; an index of these firms classified according to their products, comprising 29 groups; a trade name and trade-mark list of chemical firms; and an index giving sources of supply for raw materials and technical products.



The store and dwelling of Joseph Elkinton, which he had erected in 1831, where he launched his business venture, still stands

Beginning Another

"To dwell under a proper regard for the best things."

RESPECTED Friend: For one hundred years the written communications of the Philadelphia Quartz Company have borne the above quaint salutation. Although times have wrought many changes, those who have guided the Company's affairs during all these years have never seen fit to relinquish this salutation. In this simple phrase one senses that dignified courtesy with which Joseph Elkinton endeavored always to align his business practices.

On July 21, 1931, Philadelphia Quartz Company will officially mark its entry into the second century of business. On that same date in 1831, a factory was founded by one Joseph Elkinton in Philadelphia for the manufacture of soap and candles. For thirty years, these were the chief items of the plant, but in 1861 there was begun the manufacture and sale of a product which was destined to displace the others and to become commercially important. The product was silicate of soda. Over a period of years, the soap and candle end of the business was gradually overshadowed by the growing production and sale of silicate. In 1904, soap production ceased and soluble silicates became the exclusive products of the company.

The first location was a combined store and dwelling. A few years later, expansion of the soap and candle business was noted by the erection of a factory in the rear of the premises. Barter and exchange having been the general practice of the day, entries in Joseph Elkinton's books show many transactions in coffee, cordwood, coal, sand, grease, "barilla," carpet, etc. Also foodstuffs such as butter, pork, flour etc. All of these goods had to be disposed of before a profit had been realized on the original sale of soap or candles. Joseph Elkinton conducted the business himself for almost twenty years and then was joined by his sons Joseph S. Asa and Thomas. When Joseph S. Elkinton was taken into the firm, in 1855, the name was changed to Joseph Elkinton & Son.

Early in 1858, equipment was purchased which was apparently intended either for manufacturing or experimenting with silicate. Mixtures of silicate of soda and soap had been tried and were found useful. The experiments of the Elkintons to prove the value of silicate as a detergent evidently attracted the attention of other soap makers, for in the first month of 1861 the company's books recorded a sale of three barrels of the new product. Soon the manufacture of silicate, in the original soap factory, appeared to be supplanting the manufacture of candles, use of the latter having fallen off owing to the introduction of kerosene.

In January, 1862, the founder withdrew from the business, leaving it to be conducted by Joseph S. and Thomas Elkinton under that name. A few months later the first of the company's informative bulletins appeared, these having since become quite familiar wherever silicate is used. The first bulletin listed soda lye, candles, cracklings, clothes bluer, starch and alkaline fertilizer along with silicate and fifteen varieties of soap.

The first plant expansion came in 1864 when a new factory was set up at 9th and Mifflin Streets, Philadelphia. This was the first of nine plants which have since been added to the Philadelphia Quartz group. A partnership was then formed to trade as Philadelphia Quartz Co., the first time the present company title was used. This new plant was to specialize on silicate of soda, the soap business having been continued at the old plant under the Elkinton firm name. In 1868 the partners, Greacen and Booth sold their interests to the Elkintons.

Shortly after, the company employed Charles W. Goudy, a soap maker from Marshalltown, Iowa, to demonstrate the use and value of silicate in soap factories throughout the country. Mr. Goudy had previously been an exceptionally large buyer of Philadelphia Quartz products. He traveled with a miniature soap plant with which he could produce samples of silicated soap in the buyers' presence and was also prepared to go into the factory for large scale demonstrations. Silicate of soda sales soon began to show marked increases under this new selling method.

Hundred Years

One hundred years ago Joseph Elkinton, founder of the Philadelphia Quartz Company, laid down this business principle. At the beginning of a new century it still continues to guide those who have succeeded him

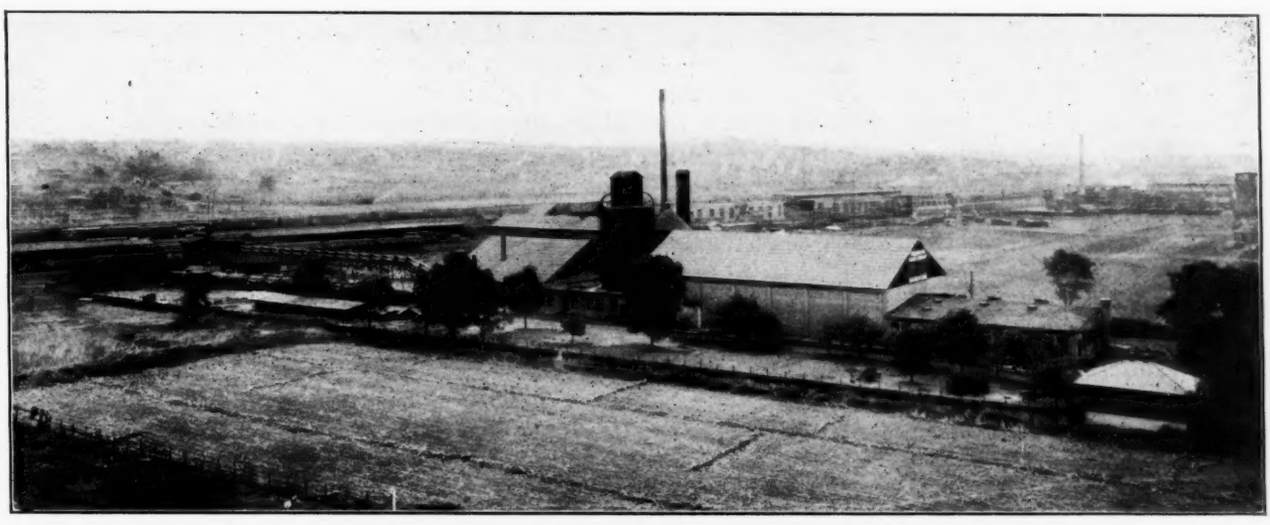
Although the adhesive value of silicate was already well known and there had been some use of the product for such purpose, it was with the introduction of the corrugated shipping box in the early nineties that a larger demand for silicate as an adhesive was created. Simultaneously came the use of silicate for laminated fibre sheets and wall board.

William T. Elkinton, who is the present chairman of the Board, joined the company in 1879. Alfred C. Elkinton, now president of the Philadelphia Quartz Co. of California, came shortly after. In 1904, the company was incorporated as Philadelphia Quartz Co. and the manufacture of soap was discontinued. Since then all efforts have been concentrated on developing the manufacture and uses of silicate of soda. When it was learned that the proportions of ingredients could be varied to produce widely different properties, useful applications for silicate in many other industries were progressively discovered and this is still going on. The catalog of silicates today includes thirty-three grades, and still new combinations claim study and experiments to meet the needs of every new condition in industry. On the threshold of another century, the pioneering spirit still dominates as again the company introduces for the first time in commercial form a new industrial alkali, sodium metasilicate.

So far as is known, this is the first advertising leaflet issued by the Company. Printed in 1862, it bears the initial printed reference to silicate of soda in Company literature; it is in the form of a four-page letter, page three carrying the written message

It is not entirely visionary to expect the developments and improvements in silicates of soda in the second century to equal or surpass those which marked the first.

Silicate of soda is a very low priced commodity. Its place in industry depends upon the refinement of economy both in production and delivery. This dictates the location of plants close to consuming markets. Of these the Philadelphia Quartz Company now has nine, located, after scientific study not only of raw material sources but most favorable delivery conditions, at Chester, Pa., Anderson, Ind.; Baltimore, Md., Gardenville, N. Y., Kansas City, Kans., Rahway, N. J., St. Louis, Mo., Utica, Ill., Berkeley, California, (Philadelphia Quartz Company of California).



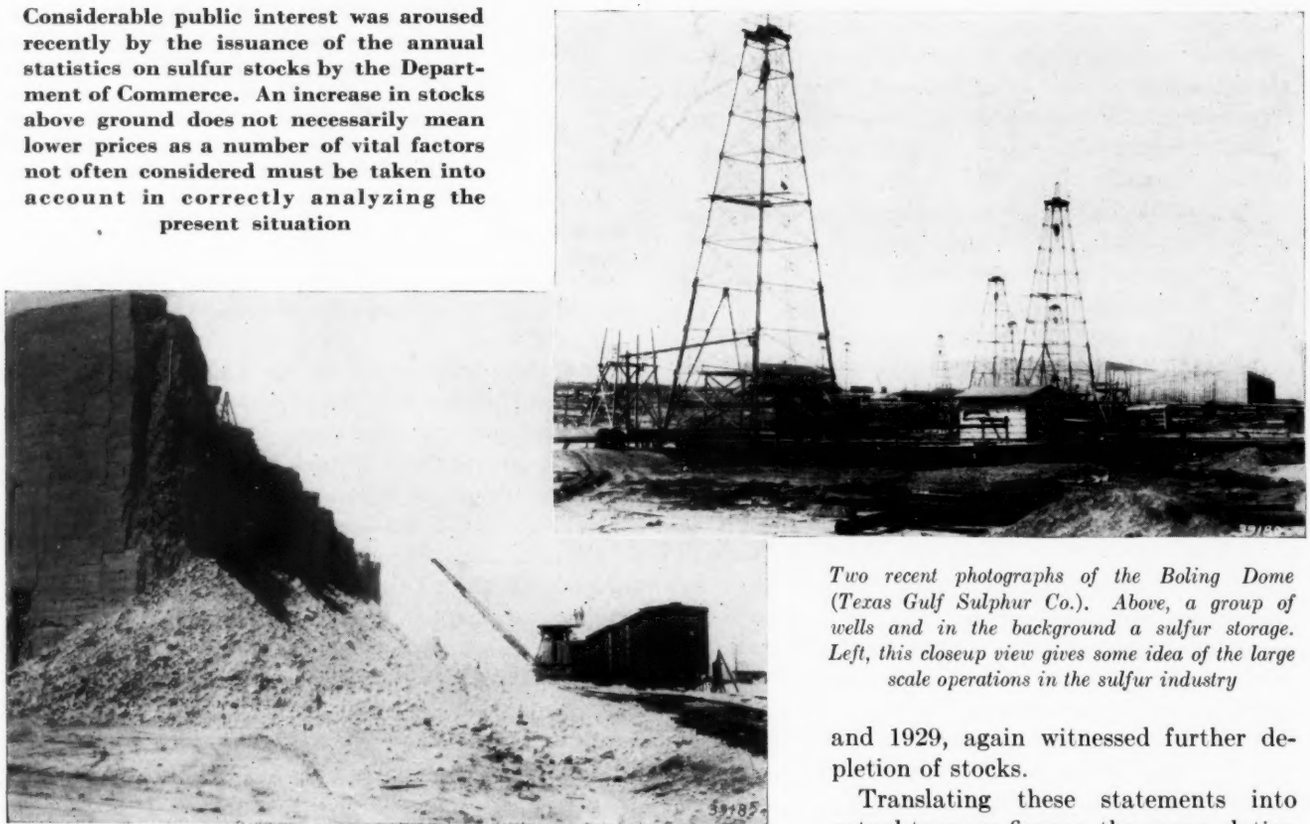
One of the nine up-to-date plants of the Philadelphia Quartz Co., Kansas City, Mo.

What Do The

Surplus Stocks of Sulfur

Really Mean ?

Considerable public interest was aroused recently by the issuance of the annual statistics on sulfur stocks by the Department of Commerce. An increase in stocks above ground does not necessarily mean lower prices as a number of vital factors not often considered must be taken into account in correctly analyzing the present situation



Two recent photographs of the Boling Dome (Texas Gulf Sulphur Co.). Above, a group of wells and in the background a sulfur storage. Left, this closeup view gives some idea of the large scale operations in the sulfur industry

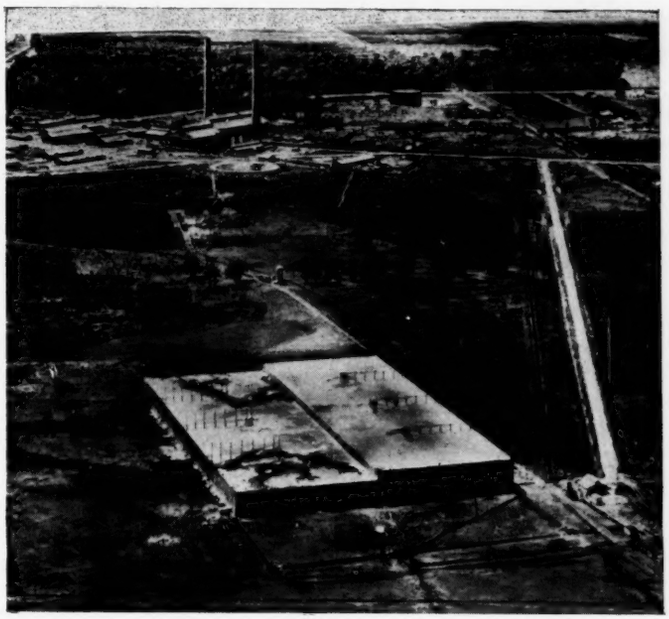
SULFUR statistics by the Department of Commerce issued recently and showing an increase in stocks on hand for the first time in several years was at once subjected to erroneous and misleading interpretation, a large part of which originated in the minds of Wall Street statisticians with a flair for chemical figures, but without the requisite background properly to appreciate several important considerations that vitally enter into any discussion of the relationship of sulfur stocks to the industry itself.

A glance at the accompanying figures show that during 1921, 1922, and 1923 accumulations of stocks were made. In 1924, 1925 and 1926 stocks were decreased. In the year 1927 consumption just about balanced production. The two following years, 1928 and 1929, again witnessed further depletion of stocks.

Translating these statements into actual tonnage figures, the accumulation of stocks 1921-1923 inclusive amounted to 1,829,290 long tons: the decrease for the ensuing three year period totaled 948,155 tons: in 1927, 39,509 tons were added, while in 1928 and 1929 stocks were lowered to the extent of 175,900 tons. Striking a balance over this period it is seen that the accumulation amounts to 744,744 tons. If the accumulation in 1930, which amounted to 569,064 tons, is added the grand total is then 1,313,808 tons.

This figure is disconcerting until analysis reveals that the increase in actual shipments of 1929 over 1921 was 1,482,804 tons. Even the average of the years 1926-1930, shows a gain of 668,526 tons per annum. In other words, the sulfur companies in their accumulation of stocks in the past ten years, including the year 1930, have just about added to their reserve tonnage the equivalent of their gain in

annual tons shipped. In the light of the following facts this gain cannot be viewed as anything but a very necessary safety measure and a real protection to consuming industries. Certainly it is not, as some of the Wall Street statisticians rashly concluded, a very probable reason for an early reduction in the price of sulfur. Properly to grasp the true significance of this increase in stocks requires further study of production and shipping figures.



A new aerial photograph of one of the Texas Gulf Sulfur Co.'s plants and a sulfur storage. These piles are larger than the usual city block. Sulfur stocks must be kept up to at least one year's requirements as the very minimum safety point

Basically, in its economic aspects, sulfur varies greatly from other important industrial chemical products. The first of these differences is, of course, its derivation. It is not made, but mined. Accordingly it is governed by the uncertainties and vicissitudes that always accompany mining operations contrasted with the close control that usually prevails in the production of heavy chemicals.

Commercial Deposits Are Few

Sulfur is widely distributed over the earth's surface but usually in minute quantities, and when it occurs in such quantities as to warrant commercial operations it is really a freak of nature. This factor is of greater importance than is commonly suspected. It determines many of the operating policies of the sulfur companies. How true this statement really is can readily be appreciated when it is noted that the history of United States sulfur production shows a number of small surface deposits which have been spasmodically operated, while the main production has come from Sulphur Mine, La., Bryan Heights, Gulf, Hoskins Mound, and Boling Dome, Texas. Both Palangana and Long Point are much smaller deposits. Over 180 domes have been shown to exist, either by drilling, or geophysical methods. Five of these, or less than three per cent, have proved to be large commercial deposits. Seven domes all told have been worked in this country. Obviously the discovery of a commercial sulfur deposit is in itself a rare event and requires special handling both from the mechanical and also the commercial viewpoint.

Subject to Mining Hazards

Not every sulfur deposit of high purity is susceptible to the adoption of the Frasch or "hot-water" method of mining. The process requires certain peculiar underlying and overlying structural conditions. For this reason no deposit can safely be said to be commercially feasible until quantity production has been secured. In other words, the expenditure to find out if a certain mound is adaptable for exploitation is for practical purposes nearly equal to that necessary for large-scale, every day operation. All this proves but one thing—the uncertainty and hazards of sulfur mining, as contrasted with the greater degree of security prevailing in manufacturing processes, or even vein mining.

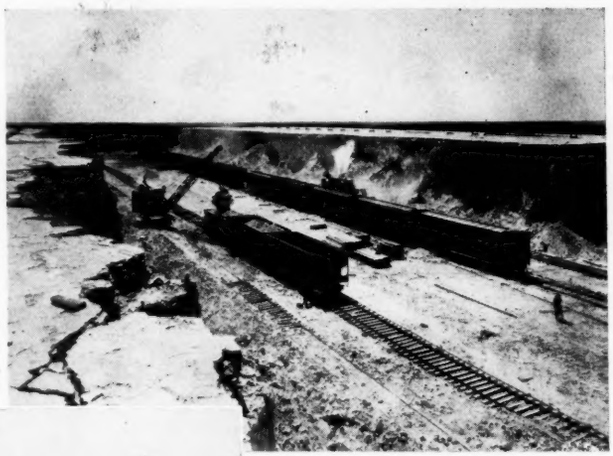
Hot-water mining is only economically possible when operations are continous. This does not mean merely for twenty four hours, or for a week, but for much longer periods. Sulfur companies must gauge their production schedules over a longer period of time, principally by the number of wells that are sunk. Accordingly, minor fluctuations in shipments of a week, or a month, or even longer can have little, if any, bearing on what the production department is taking out of the ground. The sulfur industry is one of a very few that because of the very method of production cannot hope to make as close a balance between production and shipment over any short

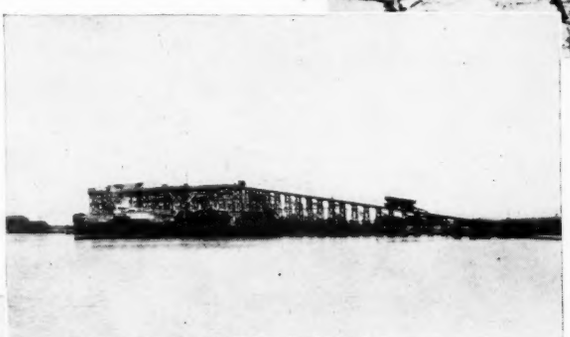
Sulfur Statistics

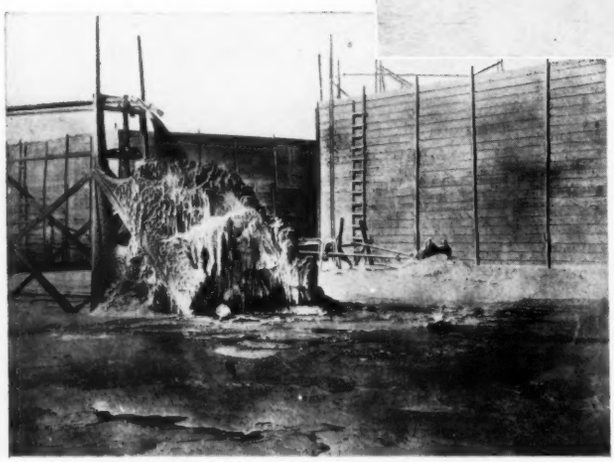
Year	*Mined*	*Shipped*	
	Quantity Long Tons	*Quantity Long Tons*	*Approximate Value*
1920	1,255,249	1,517,625	$30,000,000
1921	1,879,150	954,434	18,000,000
1922	1,830,942	1,343,624	24,000,000
1923	2,036,097	1,618,841	26,000,000
1924	1,220,561	1,537,345	25,000,000
1925	1,409,262	1,858,003	29,000,000
1926	1,890,057	2,072,687	37,300,000
1927	2,111,618	2,072,109	38,300,000
1928	1,981,873	2,082,924	37,500,000
1929	2,362,389	2,437,238	43,800,000
1930	2,558,981	1,989,917	35,800,000

period of time. The amount of sulfur that comes up from a given number of wells in, say, a twenty-four hour period is pretty much in the hands of nature. Of course over a period of weeks or months the average daily tonnage can be very closely estimated because of operating experience. Further, production can naturally be controlled by the cutting out of wells; but this is expensive for the reason that the well represents a large size investment which when idle is not returning a penny on the investment. Further, this is economically unsound since the actual operation, for example of ten wells may be very close to, if not equal to, operating costs of eight.

Sir Harry McGowan in his recent address before the stockholders of the Imperial Chemical Industries in London, stressed the economy of excess production capacities, rather than carrying large surplus stocks. His statement, however, does not apply by any stretch of the imagination to the sulfur industry. His remarks were concerned with manufactured industrial chemicals where the purchase of raw materials and the scheduling of these into production channels are susceptible to prompt revisions.







Three stages in the production and marketing of sulfur. Below, left, shows the usual construction of a sulfur storage with the moulten sulfur being pumped in, above, right, shows the wooden walls removed and the pile being broken up for shipment, and center, one of the Freeport Texas' fleet of steamers being loaded with an export shipment. Sulfur stocks above ground are the best selling arguments the sulfur companies have

Any intelligent discussion of sulfur stocks must moreover, take into consideration the length of sulfur contracts. These are made for at least a period of one year and often, for periods of two or three years. The average shipments during the years 1926 to 1930 inclusive were in excess of 2,000,000 tons per year. Stocks on hand on January 1, 1931 were reported as being 2,497,000 tons, approximately one normal year's supply.

Production in 1930 amounted to 2,558,981 tons, the largest tonnage produced in any year and eight per cent in excess of 1929, which was the previous record. The quarterly production figures for the three largest producers, Texas Gulf Sulphur, Freeport Texas, and Duval, as reported by the State of Texas Comptroller's Office, clearly show that production was not curtailed to any extent as the year 1930 wore on, because of a lessening demand for sulfur. The first quarter was the lowest, the second the largest, the third and fourth quarters running between these two. (See bottom of this column).

From these figures the logical conclusion is that the sulfur producers determined to utilize a temporary recession to build up stocks above the danger point and deliberately scheduled their production in the last half of 1930 with this idea in mind. This was a very wise move. In a period where foreign shipments fell off 31 per cent and domestic shipments 12 per cent it was much easier, without increasing to any appreciable degree productive capacity, to create a reserve adequate for at least minimum protection of twelve months. It is at this point that the hazard of sulfur mining enters.

Mining operations in individual wells are subject to ground movement, that is, a shearing movement

Company	*First Quar.*	*Second Quar.*	*Third Quar.*	*Fourth Quar.*
Texas Gulf	386,254	490,930	404,284	455,584
Freeport	187,845	209,790	173,120	211,825
Duval Texas	6,429	11,246	10,180	10,710
Total	580,528	711,966	588,584	678,119

of various strata. A general movement of the ground could conceivably shut off all production in a large and vitally important dome until new wells were drilled and equipped. Further, the mining of sulfur is not immune to any of the ordinary mining hazards that might result in a shut-down of activities. Over and above these considerations there is the fact that there is a definite limit to the amount of sulfur recoverable from any deposit.

There are a great many industries today in which the individual companies would be woefully mismanaged if they maintained a three months' supply of finished goods on hand. How much business would a sulfur company dare write on its books if it only maintained a ninety day surplus? The answer, of course, is perfectly obvious—none.

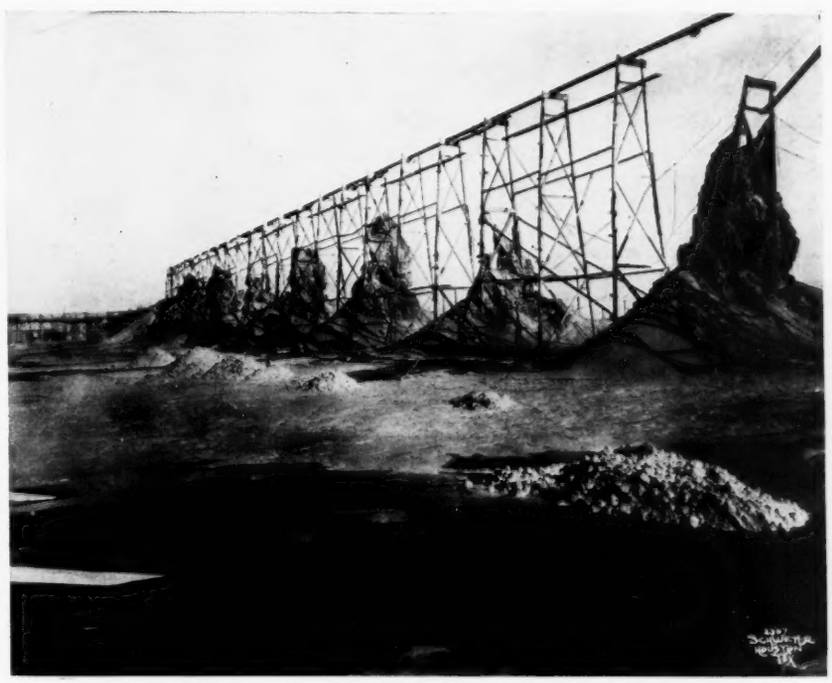
Visible Stocks Necessary

No consumer would want to be tied up to any source of supply for a year or two years when its visible surplus above ground only equaled its proposed customers' withdrawals over a quarter of a year. One of the prime requisites of a sulfur company is not only a high grade of sulfur, but also visible physical stocks of huge proportions. The user of sulfur in large quantities rightfully feels that only by this stock already mined and above ground is he afforded the necessary protection against shut-downs and expensive delays. It matters little that the sulfur is under the ground ready to be mined. What he is interested in solely is what is already above ground. How essential this surface stock is is shown by the fact that one company which ceased operations in 1924 was able through their surface stocks to fulfill contracted obligations and make shipments as late as 1929 and 1930.

The physical properties of sulfur lend it to economical storage. Huge enclosures are erected on company owned land and the molten sulfur pumped in. The land the sulfur companies own or lease, the storage enclosures can be used over and over, the sulfur is not attacked or deteriorated by the atmosphere, nor does it evaporate as does oil in storage. Therefore, from the economic viewpoint, the situation briefly sums itself up somewhat as follows within reason, of course. A sulfur company has so much sulfur underground. It is more advantageous to have this asset above the ground, its extent known and readily accessible. It need not be sacrificed at a price in order to move it before it evaporates or deteriorates. Sulfur above the ground is much more of a definite asset than it is below the ground.

The returns on the sulfur tax in Texas for the first quarter of 1931, by the State Comptroller's office, show that Texas Gulf Sulphur Co. paid $222,026.00, which tax at 55 cents a ton is the equivalent of approximately 403,700 tons, while Freeport Texas payment indicates mining operations resulting in 215,900 tons. By comparison with the report for 1930, it is plainly evident that the sulfur companies have not seriously altered production schedules.

A moment's glance at statistics showing production in the United States and foreign countries indicates that sulfur is a material the use of which has expanded at rather a rapid rate. In 1900 the total tonnage produced in all reporting countries amounted only to 555,282 tons while the 1929 figures are reported as being 2,770,107 tons. In the United States production in 1922 amounted to 1,830,942 tons while 2,362,380 tons were brought to the surface in 1929. The



While sulfur is rightfully considered as a chemical it is vitally necessary to differentiate between its method of production and other strictly raw chemicals, such as caustic soda. Unless a discussion of the situation is based on the fact that sulfur is mined, and as such is subject to mining hazards, it is worthless and misleading

sulfur companies look forward to an increasing market for their product, hence they can continue for some time to build up reserve stocks which means that production quite likely will exceed consumption for quite a period.

Stocks on hand at the end of 1930 amounted to 2,497,000 tons which just about equaled 1929 shipments of 2,437,238 tons. While 1929 consumption, when compared with previous years, was of record proportions, looking forward but a few years hence, it may be easily surpassed. It is thought, in the light of these facts, that the price of sulfur will remain firm. Other factors strengthen this expectation. The sulfur tax is now 55 cents per ton and there is agitation, and, actually legislation proposed, that would double this figure. Whether or not the sulfur companies would lower prices in the face of an increase in the contribution to the revenue to the State of Texas, is difficult to say.

The outlook for our sulfur industry is a particularly bright spot on the industrial chemical horizon. The number of uses is increasing, the tonnages consumed in most industries are expanding, exports should continue to grow from year to year. Certain processes have been announced looking to the utilization of pyrite but as yet no sufficiently large installation has been made that would give the slightest indication of their sound economic value on a competitive basis. In the first place their installation entails large expenditures, and generally speaking, more rigid control, while the contemplated savings are rather difficult to estimate in advance.

Company Booklets

Philadelphia Quartz Co. has just issued a brochure, "Beginning Another Century," written by Dr. William Stericker, Chief Chemist, to commemorate in a suitable way the completion of 100 years of successful manufacturing effort and the beginning of a second century of service. Profusely illustrated, the booklet is a valuable contribution to the history of early American chemical industry and of interest to all users of silicate in any form.

The Quaker Oats Co., Board of Trade Bldg., 141 W. Jackson Blvd., Chicago, Ill., has prepared a new booklet on, "Furfural And Its Uses in Industry," a rather popular and non-technical description of furfural and its many derivatives. It might be termed "Chemicals From Oat Hulls."

The Reilly Chemical Co., P. O. Box 433, Indianapolis, Ind. has just issued a twenty page booklet describing the many chemicals it manufactures from coal tar and its distillates.

Roessler & Hasslacher has issued for over forty years a quarterly price list. The latest appears in a much handier and more attractive way in the form of a booklet. Copies may be obtained from any of the R & H offices.

Pfanstiehl Chemical Co. (formerly Special Chemicals Co.,) Waukegan, Ill., is sending out a very complete booklet describing its many rare and metalurgical chemicals together with a price list.

Glyco Products Co., Bldg. No. 5, Bush Terminal, Brooklyn, N. Y. has issued a very comprehensive booklet, "Emulsions—Theory and Practice," of vital interest to anyone dealing with emulsifying problems.

Foreign News

The leading foreign news items of the month consisted of a definite stand by the I. C. I. in England on the question of wage reduction, and a new governmental decree creating a larger degree of protection of France's chemical industry through a system of export licenses on fertilizers and chemicals.

The Chemical Age (London) commenting editorially (May 9) on the wage situation said, "In this matter we are glad to see that Imperial Chemical Industries has set a good example. In a communication addressed to every member of Synthetic Ammonia and Nitrates, Ltd., at Billingham, Sir Harry McGowan (chairman) intimates his intention at an early date to introduce a general reduction of salaries, and adds that all members of the staff, whether in agreement or not, will be asked to share in the reduction. "You will appreciate," he says, "the difficult times through which the world is passing, and it is essential that every one connected with the company takes his or her share in sacrifices which have to be made if I. C. I. is to hold its world position."

The action of France in extending further protection to the chemical and fertilizer industry aroused considerable interest in this country. Considerable speculation was being made as to what extent this decree would effect the export business of this country specially the nitrogen fertilizer materials. In some quarters the opinion was expressed that the measure was taken to protect the French Government investment in synthetic nitrogen plants at Toulose. In others, the move was seen as a piece of strategy on the eve of the new nitrogen conference.

In Germany The Metallgesellschaft A. G., Frankfurt-am-Main is celebrating its fiftieth anniversary on May 17th. In 1881 Wilhelm Merton founded the Metallgesellschaft A. G. of Frankfurt a.M. It was organized at a time when the metal trade of Europe was still centered in London.

The World War hit this international and widespread concern especially hard. Its foreign, and especially its overseas mining and smelting enterprises, were lost. In the years after the war, out of these ruins a new business had to be built up. As a consequence, Metallgesellschaft's chief mining and smelting interests are now within Germany.

Chemical Construction

Working drawings are being prepared for the erection of a new $250,000 factory for the Braun Corporation at Fifteenth and Imperial streets, it is announced by Walker & Eisen, Los Angeles architects. The structure, for the manufacture of industrial chemicals, will be of the latest fireproof mill construction and will be 85 feet wide and 400 feet long. It will be located on a two-acre site recently acquired by the Braun firm.

Negotiations for the purchase of either the equipment of the Union Sulpur Co., or of new machinery, boilers, etc., required for a plant capable of producing about 100,000 tons are being conducted by the Jefferson Lake Oil Co. The deposit to be mined by the company is at Lake Peigneur, Jefferson Island Salt Dome, in Iberia Parish, La,

Purchase has been made of 350 acres of land, situated two miles from Corpus Christi, by the Southern Alkali Corp., to be occupied as a site for a commercial chemical plant which the company will construct at a $10,000,000 outlay. The new company is a subsidiary of the Pittsburgh Plate Glass Co. and American Cyanamid Co.

A ship channel will be dredged to connect the proposed plant with the main harbor at Corpus Christi, and a turning basin to accommodate ocean-going steamships will be a part of the improvements.

The Dow Chemical Co., it is reported has purchased a large tract of land near Wilmington, N. C., upon which it will erect a plant for the extraction of bromine from sea water.

Plant Management

A Department
Devoted to the Business Problems of Chemical-Process Production

Modern Purchasing

With costs perilously close to sales prices, purchasing assumes an importance far greater than it has held in the minds of most executives for a long period. The purchasing department is the first called upon to make possible the requisite savings so that the finished products may still be sold at a profit. This is natural, for here almost immediate results are possible, while improvements in production and economies in sales require initial expenditures and a longer period for definite results to develop.

Purchasing is long past the day of the clever, and perhaps unscrupulous buyer, naturally keen, but without specialized training. Definite control systems must be depended upon now in plants of even modest proportions to determine the minimum and maximum stock requirements, to prevent loss of capital through injudicious purchasing, to guard against the obsolescence of materials, to prevent disruptions in manufacture through the lack of raw materials, and to purchase at a competitive figure with others in the same field. These are the problems that make purchasing very definitely a plant management problem of the first magnitude and importance.

Modern purchasing and cost accounting are intimately bound to each other by the closest of ties. What, for example, comprises material costs? A recent bulletin of the Chamber of Commerce of the United States points out a few of the questions that arise frequently; the price at which material should be charged to product; the disposition of inward freight, handling, and storage charges; the accounting for waste and scrap materials, the allowance of credits for by-products, the recognition of profit or loss on sale of raw materials.

Not infrequently in large plants where chemical raw materials are produced, the sale of the surplus is under the direction of the purchasing rather than the sales department. In many corporations the purchasing department is assigned cost accountants whose duty it is to keep the actual buyers in constant touch with the plant situation. But not all corporations possess this close alliance between the purchasing and operating officials. Plants that in the Bonanza days felt that this was unnecessary "redtape" are now regretting this lack of foresight and are hastening to install the necessary machinery, physical and mental, to bring about a new and vitally necessary regime. The purchasing department can be either a tower of strength to the operating department or a millstone around its neck. At the moment this is specially pertinent.

TO THE MANUFACTURER MAKING MORE THAN ONE MAJOR PRODUCT

If your situation is in mournful harmony with that of several hundred other manufacturers in the country, you too, realize that your plant isn't anywhere near as efficient as it should be. It is equally difficult for you to operate at fractional capacity and still show a profit at all worth while.

Fortunate are you who are making more than one major product because you can by profitable stages grow from the old, inefficient buildings into a new, modern, self-contained plant.

Here's how Austin has helped some manufacturers solve this problem. And it may be that the same desirable results can be accomplished for you.

Take your growing product, one with increasing sales possibilities. Produce it in a new plant unit—possibly a full "Controlled Conditions" plant—which embodies advanced and revolutionary ideas in plant design and operation. Build this new unit on the same site or in a more strategic location. Even if it is a semi "Controlled Conditions" plant, or of the advanced conventional type, it will take full advantage of straight-line production methods. Your plant investment, may be reduced 20% to 40% and with greater earnings per sq. ft. of floor space.

This unit can be the nucleus of the kind of efficient plant which can ultimately house all of your operations. For the present, the business of your favored product can grow under tremendous advantages. At some later time your declining products can be produced in the new plant or if their doom is sealed they can be discarded ultimately with the old "White Elephant" plant.

A manufacturer in Western New York found his old line of products declining . . . profits disappearing. He saw the "Hand Writing on the Wall", stepped over to a new product having related production problems but with an entirely different market. Wisely he avoided the temptation to utilize his obsolete buildings for this new and different product . . . called in Austin to design and build a new plant suited for his requirements and based on the most advanced ideas.

Today he is in "full sail" making a substantial profit . . . finds himself in an advantageous competitive position in his new field.

Many firms with but one product can to advantage house a single department in this *new* plant unit—later adding other departments until all operations are in a "Controlled Conditions" plant.

The old French proverb, "C'est le premier pas qui compte"—"It's the first step that counts", finds a practical application in such a situation. Here's a *logical* "first step". Why not take it?

During the past year revolutionary developments in plant design have occurred. Austin Engineers, having contributed largely to these developments, can give you the benefits of their most recent studies, without obligation, of course. Phone, wire, or use the convenient memo below.

THE AUSTIN COMPANY

Engineers and Builders - - **Cleveland**

NEW YORK CHICAGO DETROIT NEWARK
PHILADELPHIA CLEVELAND CINCINNATI
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Memo to **The Austin Company, Cleveland**

☐ **Our Door is open to New Ideas! We are interested in a project of approximately.....sq. ft.**

Location.....Individual.....Firm.....City..... CM-6-31

Cost Elements
In Chemical Manufacture

L. Staniforth continues his very practical discussion on the basic principles of costing in the chemical industry. In the April issue he dealt with the subjects of raw material and steam. In the concluding article labor costs, repairs, plant records, plant efficiencies and overhead charges are analyzed.

TO ALLOCATE the amount of labour to the correct departments it is necessary that an analysis, agreeing with the weekly wages total, be made in as much detail as possible. As in other factories, labour is divided into two classes—direct, or as it is sometimes called, productive labour, and indirect, or non-productive labour. The time card punch clock of the Gledhill Brook or International type is of assistance in the preparation of the wages analysis, in addition to its other duty of recording the times for the calculation of the wages sheet. Where men have standard jobs the whole week through, the name and occupation of each man are stated on the card. When the time card is priced for wages sheet purposes the direct amount chargeable to any unit of plant or department is available on reference to the card.

There are other men in the direct labour class who work on different processes during the same week. In some factories, such as a dyestuffs manufacturing works, it may be desired to record the labour cost of each batch of product. In both these cases it is necessary to keep time sheets which should be written up daily and checked with the man's weekly earnings. Tradesmen engaged on repair work should also use such timesheets. At the end of each week an abstract is made from these time sheets, and the totals charged to the particular process, batch or department as the case may be. A specimen time sheet is shown. (611)

There are several methods of allocating the non-productive labour which vary with the type of chemicals manufactured. In some cases these charges are split up according to the weight manufactured in the different departments, and in others according to the percentage relationship to the direct labour. Before leaving the question of labour costs, one or two cooperative bonus schemes which have been successfully introduced to the mutual benefit of the employee, customer and employer may be found to be of interest. The firm in mind have been able to meet severe competition chiefly on account of labour saving and increased production due to cooperative bonus schemes. Very simply the principle of the scheme is as follows:

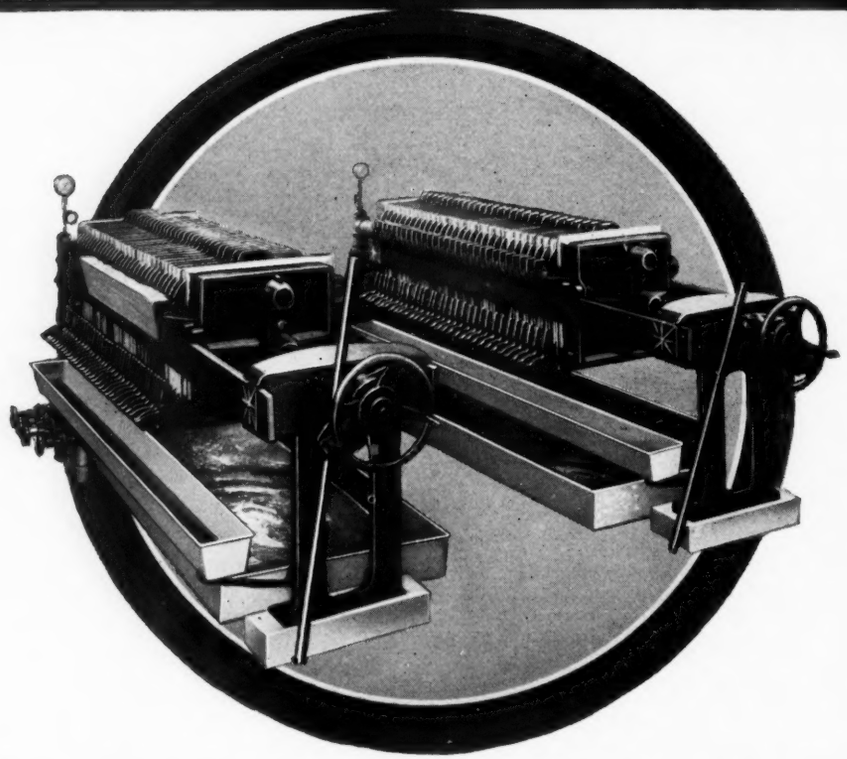
(a) Fix bogey figures which are usually the actual costs for materials, steam and labour for the previous year. (b) The value of any saving is credited to a "Pool Account." Of course any excess costs are debited to the same account. (c) At the end of an agreed period, say every three months, the Pool Account is balanced and the amount is divided as follows: one-third is divided amongst the employees according to the amount of wages or salaries paid to each during the period. One-third is passed on to the customer as a reduction in the selling price. One-third is retained by the employer.

Another simple scheme for speeding up production and, therefore, reducing costs is the calculation of the production per man per hour, and payment to the employee in respect to any saving in cost. A standard of output for a given number of hours is fixed, generally based on past results. As an example, assume that 100 men, working a total of 1,000 hours, produce 1,000 tons of material, or a production at the rate of one ton per man per hour. If, during the next period 1,150 tons are produced in a similar number of hours, the rate of production has been increased to 1.15 tons per man per hour, equivalent to a 15 per cent increase. Each employee, therefore, receives a bonus of 15 per cent of his earnings

By L. Staniforth*

*Cost Accountant to Brotherton & Co., Ltd.

SHRIVER FILTER PRESSES



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LABOUR TIME SHEET

..... Works Week ended .....

No ..... Name ..... Occupation .....

Cost Acct. Number	Particulars of work done showing Batch No.	Hours. Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Total No. of hours	Rate	Amt. £ s d

Specimen time sheet mentioned on page 609

during the period of the increase, provided always that the manufacturing efficiency has not suffered in consequence of the speeding up. The employer's share of the bonus is, of course, the benefit of the increased production for practically the standard amount of fixed charges.

Repairs and Engineers Stores

The correct charging of engineers' stores is of great importance and an efficient control of this element of cost is essential. The advantages are:

(a) Correct cost is charged to the actual unit of plant receiving the material.

(b) The storekeeper can make periodical reports to the buying department on articles which have reached the minimum stock figures fixed by the management.

(c) Stocktaking is much simplified, as the stock of any class of material can be taken as opportunity occurs, without the paralysis of work which accompanies a general stock-taking.

(d) The working capital employed in carrying stores may be kept within reasonable limits.

All this should be kept under the charge of a reliable storekeeper. Bins or other receptacles should be provided for every group of material. Stock cards should be fastened upon each bin stating: Description of article, maximum and minimum stocks to be kept, purchases with reference to invoice number or supplier if essential, issues to the works stating the requisition number, current stock ascertained by deduction.

No. 3201

STORE'S DEMAND

Date .....

Supply ..... No ..... with:-

Cost A/C	Job No.	DESCRIPTION OF STORES: Number	Article	Weight: t	c	q	l	Rate	£	s	d

Remarks ..... Signed .....

Form No. 16.

When stores are required a requisition signed by the Plant Foreman responsible, should be made out stating the quantity and description of the article required. The requisition is entered by the storekeeper on the stock card on the bin, and it is then passed to the office, priced and recorded to the particular unit of plant concerned. Greases, engine oils, waste, bar iron and lead, although not in bins may be treated in exactly the same way as small nuts and bolts. Specimens of actual forms in use are shown as follows:

BIN CARD (2)

Article ..... Bin No .....

No .....

Maximum .....

Minimum .....

IN Out

Date	Order No.	Supplies	Quantity	Date	Requn. No.	Used by	Quantity

Plant Records

The success of the cost analysis depends upon dividing each manufacture into a number of separate processes and showing clearly the efficiencies and costs of each of these processes. The statistics relating to an individual process may, therefore, be considered in detail and apart from the final product into the manufacture of which they enter.

To enable this to be carried out plant records or flow sheets are necessary and these are compiled not only for cost purposes but for consideration by the chemist in charge. These flow sheets are written up daily, and the following may be taken as typical of the information required to be recorded:

Identity of part of process i. e. Still No. Vat number, etc.

Quantity and description of raw materials charged, with the laboratory test if necessary, or, if material has come from a previous process, record the place of origin.

Time process commences.

During the course of the operation records of the various chemical changes, additions of various process materials, temperatures, etc. should be made.

Time process finishes.

Quantity or measurement of material finished as far as that stage is concerned.

Quantity and test of material sent forward to next operation.

Such records serve the following purposes:

(a) They record work done by each unit of plant.

(b) As an aid to tracing complaints—for example—Complaints respecting the quality of the finished article may possibly be traced by chemical changes recorded on the Flow Sheet, or the time taken for the particular operation.

(c) They form the basis of apportionment when the common charges, i. e. general labour, overhead charges, etc., are being allocated.

(d) They enable credit to be correctly allocated should by-products be recovered in any particular part of the process—a record of such by-products having been made.

In addition to written records of the working of chemical processes, automatic recorders are now of inestimable value. The instruments in question record: times, pressures, inches of vacuum and temperatures.

Use of Recording Instruments

Mention has already been made in the course of this paper respecting steam manufacture, of the instruments used at the steam boilers. These recorders are so constructed as to make permanent records of the chemical and physical changes taking place in the process. The work of supervision during night shifts has been greatly reduced as the charts show working details over a continuous period of twenty-four hours. There is hardly any part of a chemical plant where these recorders cannot be usefully employed.

Assume that poor results both from a technical and cost point of view are taking place in a chemical vat. The workmen has instructions from the chemist to heat the vat gradually to a given temperature in a given time and then slowly add a further quantity of chemical which reduces the temperature owing to chemical reaction. The man may inadvertently heat up the vat too quickly or add the chemical at the wrong time and so affect the efficiency of the process or the quality of the finished product. A study of the temperature chart covering the period will bring to light any error on the part of the workmen. Where vacuum recorders are used and a batch of material is rendered useless through loss of vacuum these instruments show the time the vacuum was broken and the length of time the operation was held up.

Plant Efficiencies

For a chemical manufacturer to be able to meet the severe foreign competition of the present day it is imperative that his process be worked at the highest possible efficiency. The flow sheets and automatic recorders already mentioned lend assistance to the cost accountant in the preparation of efficiency accounts. For this purpose each process should be treated as an individual unit and the chemist given standard "bogies" with which to compare the actual output of each part of the plant.

In the manufacture of most products a theoretical chemical equation is available which enables the final production of a plant working at 100% efficiency to be calculated. This theoretical yield is used as the "bogey" and the following is an example of this theory in the manufacture of hydrochloric acid. The materials used and the products obtained are given their chemical names, and calculated as 100% materials by using their atomic weights. Example:—One part sulfuric acid plus two parts sodium chloride (Common Salt)=Two parts hydrochloric acid and sodium sulfate (Saltcake). The chemical equation is:—

H_2SO_4 plus 2NaCl=2Hcl plus Na_2SO_4, which expressed in the atomic weights of the products concerned is:—98 plus 117=73 plus 142. If these figures be analysed the following bogies which are really the theoretical productions are obtained. The sulfuric and hydrochloric acids are shown in terms of their commercial strengths.

1 ton 70% sulfuric=34.76 cwts 30% Hydrochloric.
1 ton " " =1.01 tons 100% Saltcake
1 ton 100% Salt =41.59 cwts. 30% Hydrochloric
1 ton " " =1.21 tons 100% Saltcake.

An efficiency account, using the above bogies, would read:

HYDROCHLORIC ACID

PERIOD	Prod. 30% Hydrochloric cwts	SULPHURIC ACID 70% Tons used	Theor. cwts. 30% H.Cl.	Plant Efficiency	COMMON SALT 100% Tons used	Theor. cwts. 30% H. Cl.	Plant Efficiency
Year							
1929	59,837	1,882	65,418	91.46	1,598	66,461	90.00
1930	51,364	1,691	58,779	87.36	1,397	58,101	88.41
Jan	4,346	139	4,832	89.96	117	4,866	89.31
Feb	4,721	168	5,840	80.85	142	5,908	79.95
Mar	4,934	155	5,388	91.57	131	5,428	90.90
Qtr.	14,001	462	16,060	87.18	390	16,119	86.45

This account compares the efficiencies of the manufacture of hydrochloric acid from the quantities of raw materials used.

Another method of comparing the plant efficiency may be of interest, and as hydrochloric acid may be taken as a typical chemical the same materials and quantities will be used as examples. Further calculations are necessary, and the new bogies are as follows:

1 cwt. 30% hydrochloric acid requires 0.0288 tons 70% sulfuric
1 " " " " " 0.0240 " 100% Salt
1 ton 100% Saltcake " 0.9901 tons 70% sulfuric
1 " " " " 0.8264 " 100% Salt

Hydrochloric Acid

Period	Prod. 30% HCl Cwts	Sulfuric Acid 70% Consumption Theory	Consumption actual	% Excess	Common Salt 100% Consumption Theory	Consumption actual	% Excess
Year							
1929	59,837	1,723	1,882	9.23	1,436	1,598	11.28
1930	51,362	1,479	1,691	14.33	1,233	1,397	13.36
Jan	4,346	125	139	11.20	104	117	12.50
Feb	4,721	136	168	23.52	113	142	25.66
Mch	4,934	142	155	9.15	118	131	11.02
Qtr.	14,001	403	462	14.64	335	390	16.42

The same periods are used as in the previous account and, therefore, the two methods can be compared.

"Bogey" need not necessarily be the theoretical chemical yield although it is advisable to use it if available.

Sometimes it is not possible to arrive at a reliable theoretical quantity, and in such a case the best results obtained during the previous working year may be taken as the "Bogey." It naturally follows, therefore, that if the same "bogey" be used throughout, the comparison of results in the same process will show whether progress has and is being made and continued and, of course, vice versa. The chemist need not worry about the material cost at the plant, as if these efficiency records show that the maximum quantity of finished products is obtained from a minimum quantity of raw material the cost will take care of itself.

Product Sheets

In the manufacture of some chemicals and oils, the raw materials pass through several stages before the final distillation is completed. It is not possible to check the efficiency or cost unless departmental accounts are prepared as there are generally large fluctuating quantities in stocks unfinished at the intermediate stages. The actual yield from the original raw material for any period is obscured unless each stage is treated as a separate statistical account. An illustration of such a system will possibly help to make this meaning clearer. At a gas works, coal is split up into coal gas, crude tar and ammoniacal liquor. Crude tar is purchased by the chemical manufacturer and is distilled into finished products in specially constructed processes. The products which can be made from crude tar number many hundreds, but to simplify matters only a few of the principal ones will be taken.

At each stage some oils are finished ready for delivery to customers and others made at the same stage and from the same raw material (i. e. Crude Tar), are sent forward for further distillation. A summary of the stages may be of interest. Items marked with a (x) are finished products so far as distillation at a Tar Works is concerned. The items going to the next stage for further treatment are marked (o).

Stage No.	*Plant*	*Charges*	*Product*	
1	Tar Stills	Crude Tar	(Ammoniacal Liquor	(x)
			(Crude Naphtha	(o)
			(Light Oil	(o)
			(Crude Carbolic Oil	(o)
			(Creosote	(x)
			(Anthracene Oil	(x)
			(Pitch	(x)
2	Oil Stills	Crude Nap.	(Crude Benzol	(o)
		Light Oil	(Crude Solvent	(o)
		Cr. Carb. Oil	(Crude Heavy Naphtha	(o)
			(Carbolic Oil	(o)
			(Creosote	(x)
3	Washing Plant	Cr. Benzol	(Crude Tar Acids	(x)
		Cr. Solvent	(Washed Crude Benzol	(o)
		C. Hy. Nap.	(Washed Crude Solvent	(o)
		Carb. Oil	(Washed Cr. Hy. Nap.	(o)
			(Washed Carb. Oil	(x)
4	Rectifying Plant	Washed Cr. Benzol	(Benzol	(x)
			(Solvent Naphtha	(x)
		Washed Cr. Solvent	(Heavy Naphtha	(x)
			(Refined Pyridine	(x)
		Washed Cr. Hy. Nap.	(Creosote	(x)

Each stage is treated as a separate process so far as costs and efficiencies are concerned. Steam, fuel, chemicals and labour are also directly used at each stage and separate cost accounts are prepared. What the cost accountant, therefore, wishes to know is that the maximum contents of the original crude tar are being obtained. A debit and credit account is made out for each department, charging the quantities distilled together with the constituent values of each oil and crediting the actual production of finished products at each stage together with the contents of the intermediate oils passed forward to the next stage or in stock. The quantities transferred from one department to another are abstracted from the plant records or flow sheets, and their constituent values are obtained by means of chemical analysis made in the laboratory. The departmental product sheet could be adapted to most processes having several distillations, such as tar distillation, soap making, perfumeries, petroleum refineries etc.:—The information it brings forward is:

1. The quantities passing through each department, thus making it possible to prepare a departmental cost account from the figures.
2. The actual loss through either evaporation or leakages at each stage of the process and the loss through bad fractionation may be traced.
3. A summary of the stages will show the total yield of the finished products from the crude raw material having made due allowance for the fluctuation of the stocks of intermediate oils.

This total yield may be compared with the actual analysis of the original raw material.

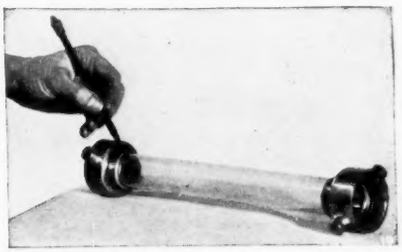
Overhead Charges

In every manufacturing business it is unquestionably true that in some months, items of expense will occur which are not properly chargeable against the cost for that month. For instance, it may be found necessary to make extensive repairs on a plant, sufficient for the entire year, and it would be manifestly unfair to include the entire repairs in the cost of any given month. Furthermore, most businesses have

dull seasons when departments are not running at full time, and this would also result in the actual costs for those months being abnormally high. It is necessary, therefore, that overhead costs be averaged over a period of time sufficiently long to take in both dull and busy seasons. Overhead costs cover all the non-productive items which cannot be charged directly to any one department. Factory expenses are incurred which cannot be allocated as belonging to any department. These items should be distributed over the departmental expenses accounts on some basis which is fair to all.

Equipment Ideas

A new method of soldering glass to metals has been developed by the Westinghouse Electric and Mfg. Co., East Pittsburg, Pa. This new method, as shown in the accompanying photograph, has been used in the manufacture of sanitary glass piping.

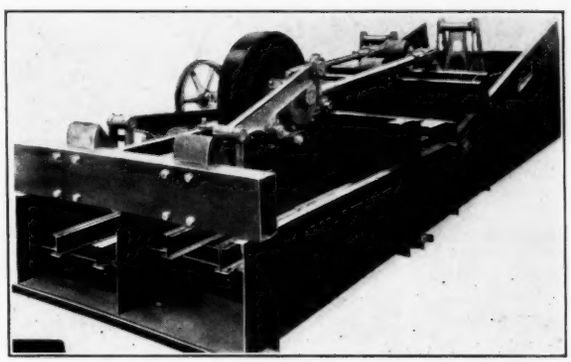


Soldering glass to metal by an entirely new method

It will be used in sanitary solder joints for windows in metal tanks, and also in the joining of metal bushings to the glass lining of glass-lined tanks.

This new development is based on successful research work regarding the possibility of obtaining gas and oil tight seals between porcelain bushings and the metal collars for supporting these bushings.

New Dorr Thickener

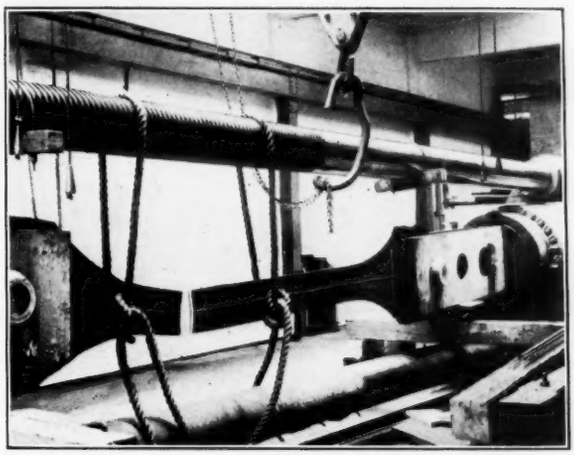


The Dorr Co. has introduced for general classification service a new and improved type of mechanical classifier known, as the Dorr F Classfiier. The mechanical improvements in the design and the use of an entirely new and advanced type of head motion have greatly extended its field of application, and permitted the use of higher speeds than formerly possible. The use, where possible, of these higher speeds has been accompanied by a corresponding increase in sand raking and overflow capacities where these high rake speeds are consistent with the separation desired.

Westinghouse Electric & Mfg. Co., has issued a new 12 page booklet, "Westinghouse Small Generators Unit . . . and their Application."

A Caldwell Screw Conveyor (Installation Link-Belt) handling salt obtained by the evaporation of the waters of the Pacific Ocean. A novel and economical method of conveying certain types of industrial chemicals.

Testing Welding Strengths



Courtesy: The United States Daily

Emery Testing Machine in use in the Bureau of Standards for testing, welding and riveting. The machine has a capacity tension of 1,130,000 pounds.

New Incorporations

New York

Buch's Chemists, chemicals—I. A. Himber, 8 W. 40 St. $20,000.

Ferd Muhlens, vegetable, mineral oils—Katz & Sommerich, 120 B'way. $300,000 pf. 1,000 shs. com.

Rochester, Penn Drake Oil & Gas Corp. of N. Y.—W. H. Burr, Rochester, $50,000.

Pyramid Chemical Import Co. fly catcher preps.—H. Klein, 5 Beekman St., 10 shs. com.

Frank L. Humbert & Sons, chemicals, fertilizers—W. F. Forster, 200 shs. com.

New Jersey

Rockland Chemical Co., Inc., Newark, chemicals—Leland & Talliaferro, Newark, 1,000 shs. com.

Empire State Paint & Varnish Co., Newark, Mfrs. paint—E. Stanley Marks, New York City, 2,000 shs. pf. 500 shs. com.

Delaware

Ft. Dodge Serum Co., Wilmington, Del., drugs, chemicals—Corp. tr. co. $1,000,000.

Consolidated Ozone Corp. Mfrs. Ozone—Corp. Tr. Co., 2,000 shs. com.

Unit Petroleum Corp. N. Y. C.—Prentice Hall Inc. of Del. 100,000.

Fig. 1. A power shovel unloader discharging soda ash to a traveling elevator hopper at a large glass factory

VISUALIZING

The Handling of Chemicals

By E. J. Burnell*

MOVING materials from where they are to where you want them is a common task in the chemical plant. Most ingredients, being in bulk during processing, require one type of handling, while the completed, packaged product needs a different method. Several hand handlings during production increase the cost rapidly, whereas the proper mechanical handling of all materials will reduce overhead, save time, and have the ingredients, or product, where you want them, when you want them there.

Different plants require different methods. Pictorially, we will give some methods now in use that have solved this problem for others in an efficient and economical manner.

Unloading of bulk dry materials from box cars is a job that the power shovel does well. Fig. 1, shows such a unit unloading glass sand from cars to the receiving platform hopper, at the Charleston, W. V. plant of the Owens Bottle Company.

*Sales Manager, Link-Belt Company, Chicago.

Bulk liquids are easily pumped from tank cars to storage or the processing line. Packaged materials can be unloaded by hand to a conveyor running along the platform, for delivery to the storage house or to the unpacking floor—the first protection step.

Liquids in containers might be unloaded similarly to the method employed by a New Jersey oil company, where five drums per minute are elevated from the receiving floor to the storage floor and then conveyed to storage.

Processing plants must have ample storage facilities. Conveying equipment for such requirements varies to suit the individual requirements, and the characteristics of the ingredient handled.

Outside storage of dry material, as shown in Fig. 3, illustrates the combined use of a permanent chain and flight conveyor and a portable belt conveyor, for greater and more flexible storage. The portable conveyor also acts as the reclaiming loader, feeding the elevator, in the background of this illustration, for rehandling the stored material to the first step in the

Fig. 3. Coal handling equipment, yard, storage, and batch house at a large glass factory in New Jersey

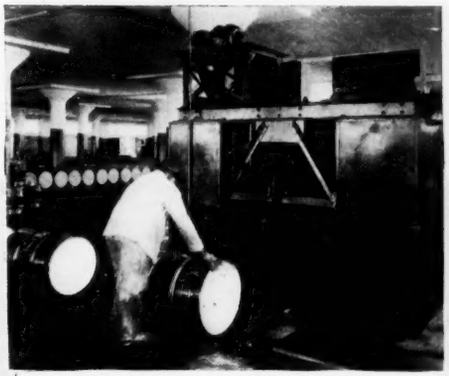
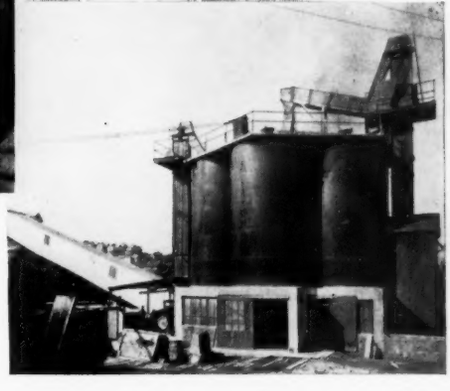


Fig. 2. General view of head end of contact discharge elevator in a large oil refinery. Capacity 5 barrels per minute

Fig. 4. This glass handling equipment in a factory at Washington, Pa., moves all of the raw materials to the furnaces



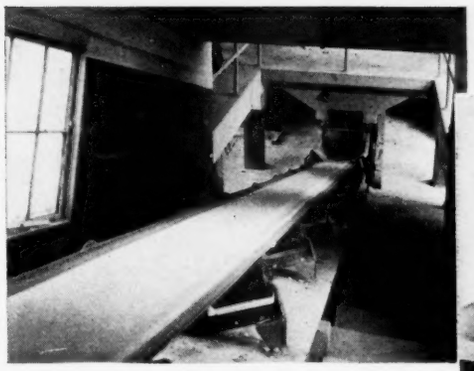
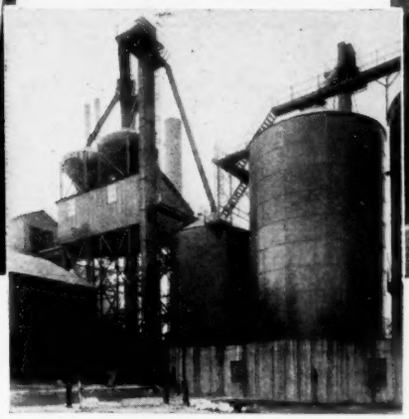


Fig. 6. Reciprocating feeder in the background delivering to a 30" belt conveyor running at 20 degree angle in the factory of the Detroit Rock Salt Co.

Fig. 5. Head of Cullet apron conveyer and collect elevator at plant of American Window Glass Co., Arnold, Pa.



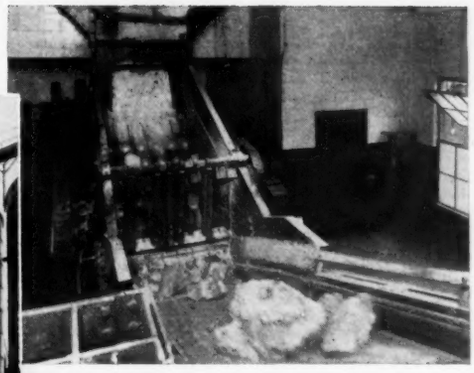


Fig. 7. Conveying and crushing salt at the plant of the Detroit Salt Co.

production process. This type of installation gives flexibility of storage at a small expenditure for conveyors. Such a layout might also be used where dry materials are stored under roof.

The Highland Glass Company, Washington, Pa., employ a novel method of handling silica sand, soda ash, etc., to and from storage. This idea may be adapted to most dry chemicals. See Fig. 4. The silica sand, and etc. is brought to the plant and dumped into a track hopper, where an apron feeder discharges it to an elevator, thus elevating the sand to a belt conveyor having a two-way chute feeding a swivel belt conveyor, which in turn discharges into storage tanks. Reclamation is handled by screw conveyors and a belt conveyor to the processing department.

Storage of bulk finished chemicals, awaiting shipment or packing, can be mechanically handled similar to the method illustrated in Fig. 5.

Belt conveyors are very adaptable for the conveying of large quantities of bulk materials at a low cost per ton. The photograph, see Fig. 6, shows a 30" belt conveyor running at a 20 degree incline, handling salt at the Detroit Salt Company, Detroit, Michigan. One of the features of this installation is the use of anti-friction granitized idlers, which prevents the corrosion and sticking of salt to them. Fig. 7 shows a rotary grizzly under a Bradford breaker, which feeds the picking belt at this plant. Hand handling is almost entirely eliminated.

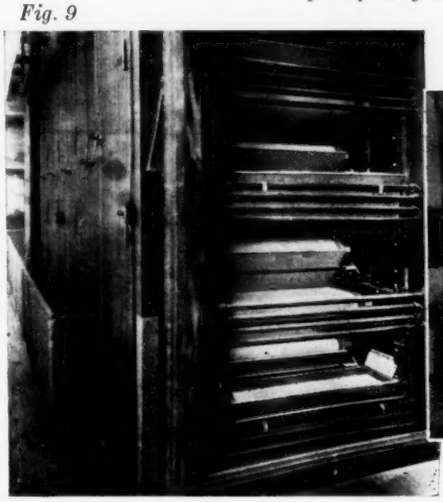
In getting the salt from the salt beds of the sea, the western refineries use conveyors for handling their product through many stages of the refining process, quite often a helicoid screw conveyor handling the salt to storage.

Every time I have a headache, I think of the efficient way in which Bromo-Seltzer is handled and prepared for the market. Fig. 9 illustrates one point in this processing, the continuous dryer which consists of continuous belts running back and forth through the drying oven. After packing, the bottles are conveyed in tote boxes from a tray elevator, Fig. 10, which carries them to the packing floor for labeling and putting in containers for shipping or storage.

Screw conveyors play an important part in glass batch handling. The equipment at the Highland Glass Company plant, shown in Fig. 11, are reclaiming screw conveyors which bring the ingredients from their

Left, drying and conveying fine chemicals, right, automatic transfer of finished packages, and center, another view of a glass factory showing screw conveyors, weigh hopper, batch mixer and foot of inclined belt conveyors

Fig. 9



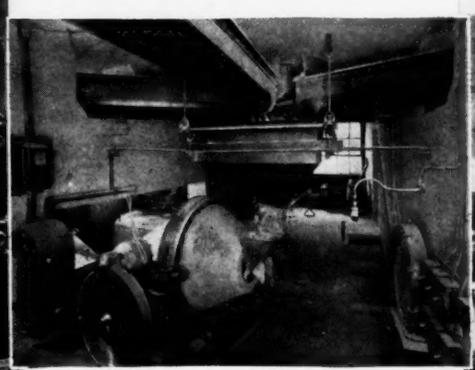
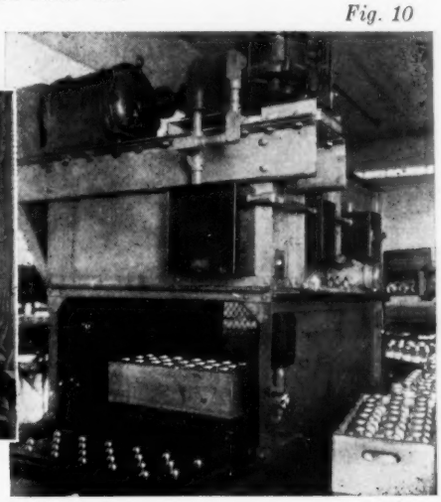
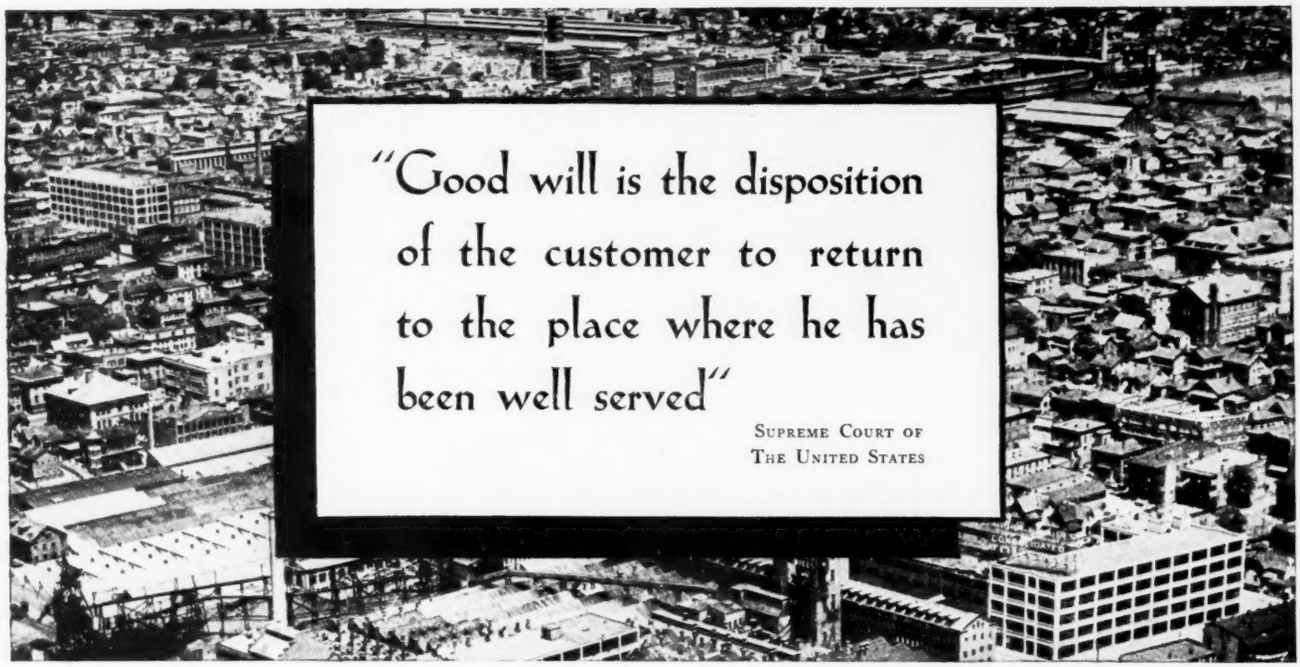


Fig. 11

Fig. 10





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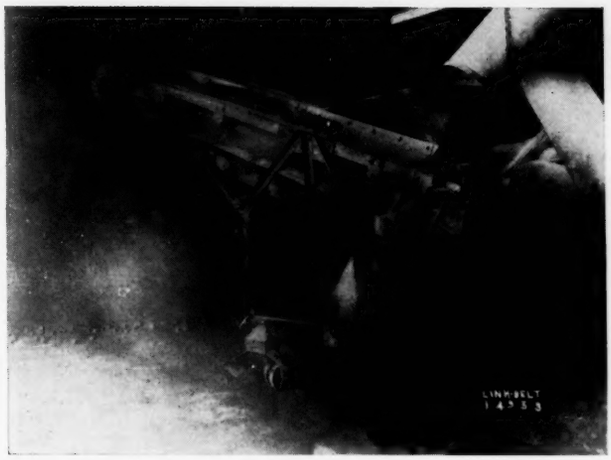

Fig. 12. Loading acid phosphate at the plant of the Reading Bone and Fertilizer Company, Philadelphia, Pa. with a box car loader

storage to a weigh hopper for precision batching. After weighing, into the mixer goes the combined batch, from which the mixed batch is discharged to a belt conveyor for conveying to the next process.

After processing materials stored in bulk, such as mentioned in early paragraphs of this article, the problem of shipping is incurred. Many plants make shipment in bulk, loading box cars with loaders, Fig. 12, or if bulk liquids, they are conveyed to tank cars by pipe line.

Sometimes it is essential that bulk storage of liquids be utilized for smaller shipments in containers. At a New Jersey plant the method shown in Fig. 13, is used. Drums are conveyed, on a single strand chain conveyor, to the tanks from which they are filled, then put back on the conveyor for conveying to the shipping platform.

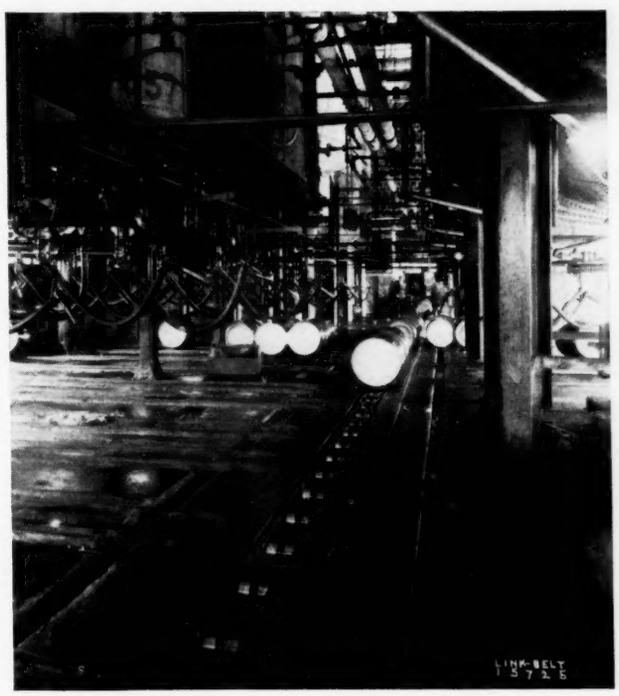

Fig. 13. General view of a barrel conveyor (maximum load 7,600 lbs. at speed of 75 per minute) in a well-known chemical plant. Mass production methods in the chemical industry are dependent upon automatic conveying of both raw and finished goods

As before stated, each plant has processing and storing peculiarities which require the study of a materials handling engineer of wide experience. Conveyor manufacturers have the experience necessary to recommend the most efficient and economical method that will produce results.

Equipment Bulletins

Plant Managers, plant engineers, consultants, those in charge of operations, and purchasing agents will find in this column valuable suggestions in the way of new booklets bearing on equipment, etc.

The Plant Management Department of Chemical Markets will be glad to forward requests for the above booklets to the proper channels for attention should this be preferred.

F. J. Stokes Machine Co., Tabor Road, Philadelphia, Pa. has just issued a very attractive booklet on process equipment containing over fifty pages of illustrations of actual installation together with valuable engineering data on such subjects as drying equipment, extraction and solvent recovery apparatus and special process equipment. These are but three of the many phases of chemical engineering treated. The booklet should be of interest to plant managers, engineers and those controling equipment purchasing.

Chemicolloid Laboratories, Inc., 44 Whitehall St., N. Y. C. has released a booklet on the Charlotte line of colloid mills profusely illustrated and giving specifications of the various sizes of mills. The company has also prepared a leaflet on the Charlotte Junior introduced at the Chemical Exposition.

The Steel Barrel Manufacturers Institute, Cleveland, Ohio has just completed a new comprehensive booklet, "Information For Buyers & Users of Steel Barrels and Drums." The booklet should prove to be an invaluable aid to all users or prospective users of steel drums. The complete I. C. C. specifications are included.

Pulverizing Machinery Co., 30 Church St., N. Y. C. are issuing to the trade a new booklet describing in great detail dustless pulverizing without separating or bolting as done by the Mikro-Pulverizer. For the engineer or plant manager confronted with a pulverizing problem this loose leaf booklet will present several new ideas.

The Duriron Co., Inc., Dayton, Ohio are mailing a booklet on Alloy Steel Castings giving in addition to a complete description of Durimet, and Durco Nirosta, important corrosion and technical data.

Fansteel Products Co., Inc., North Chicago, Ill., has just released a new booklet on "Tantalum in The Process Industries." It is one of the very few scources of printed information on the possibilities and growing use of this particular metal in the industrial field.

Revolvator Co., 336 Garfield Ave., Jersey City, N. J., a new leaflet on a new liftruck, Bulletin 93J from their general catalog.

W. A. Taylor & Co., Inc., Baltimore, Md., a new leaflet describing in detail the new slide comparator exhibited at the Chemical Exposition.

Federal Pneumatic Systems, Inc., 127 N. Dearborn St., Chicago, Ill., a new leaflet on its Federal Laboratory air separating unit (Bulletin No. 25).

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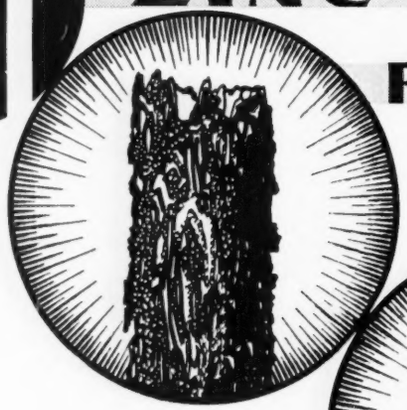
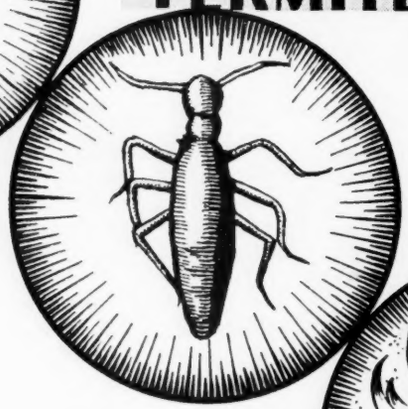


TERMITE-RESISTANT



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Chemical Facts and Figures

Foreign Trade Off in First Quarter—Lacquer Patents Association Announced—William S. Gray Handling Borax—Dorr and Oliver United Filters Unite.

Several important items vied with one another for first place in the industrial chemical news of the month, foreign trade, falling off to the extent of over 25 per cent for the first quarter; the proposed agreement of the Lacquer Patents Association was made public, the controversy over methanol as an anti-freeze continued to occupy the center of attention in Washington, and the Texas Legislature, a few hours before it adjourned (May 24), passed a bill raising the sulfur tax to 75 cents.

U. S. Foreign Trade

United States foreign trade in chemicals and allied products during the first quarter of 1931 was low. Exports valued at nearly $34,000,000 were 26 per cent and imports of $36,000,000 were 38 per cent less than the figures for the corresponding period of 1930. Usually, during the first quarter of any normal year, the largest imports of the year are recorded while exports are the smallest. Whether this is true for 1931 is problematical, since the United States is dependent upon rather large imports of many necessary crude materials, such as gums and resins, of which receipts were only a little more than half as much as in the corresponding quarter of last year. Fertilizer imports recorded a loss of almost one-third, but in this branch the United States has been developing its own resources especially of nitrogen, and, to a less degree, potash.

Although comparisons are not absolutely accurate, owing to the changes in classifications for both exports and imports, the following table shows the trend in the trade by major groups during the first quarters of 1930 and 1931:

In the industrial chemical line, chemical specialties, on the whole, apparently maintained their position, with the total of $3,754,000 worth exported during the 1931 quarter only 4 per cent below the corresponding figure for 1930. Approximately one-third of this total is made up of insecticides, fungicides, and similar preparations, which commodities last year were outstanding because of the gains made. The somehwat reduced shipments of 6,125,000 pounds ($1,200,000) in the 1931 quarter is not surprising, therefore. Exports of industrial chemicals were reduced 15 per cent, to $5,120,000, in the first three months of 1931; of these, however, the younger branch, synthetic organic chemicals other than alcohols of non-coal-tar origin, improved from 2,353,000 pounds ($212,000) during the first quarter of 1930 to 2,662,300 pounds ($250,000) during the first quarter of 1931. Not all industrial chemicals made reductions; calcium chloride, citrate of lime, copper sulfate, hydrogen peroxide, sodium cyanide, sodium sulfate, zinc compounds, and chlorine all showed gains in the 1931 quarter. Likewise, a few chemical raw materials imported recorded gains, although the total imports of industrial chemicals were down 28 per cent, to $4,577,000, in the 1931 quarter. Incoming shipments of glycerin more than doubled those of the 1930 quarter, to 3,400,000 pounds ($209,000), while argols increased 85 per cent, to 4,724,000 pounds ($449,000)

Fertilizers

Only two-thirds as much fertilizer was imported in the current quarter, or a total of 528,000 tons, valued at $17,262,000. Receipts of potash fertilizers declined over 50 per cent, to 136,000 tons ($3,136,000), and nitrogenous fertilizers over 20 per cent, to 345,000 tons ($13,028,000). In the nitrogenous group the only gain was in ammonium sulfate receipts, which rose from less than 2,000 tons ($57,000) to 25,000 tons ($927,000). Sodium nitrate fell from 282,000 tons ($10,840,000) to 234,000 ($9,146,000). The marked declines were in ammonium sulfate nitrate, calcium cyanamide, and calcium nitrate.

Only about three quarters as much fertilizer and materials were exported in three 1931 months, or a total tonnage of 311,000 tons ($3,883,000). All classes shared in the reduction in tonnage, with the exception of ammonium sulfate, exports of which rose from 29,300 tons, $1,163,000 to 35,900 tons, $1,220,000.

United States Foreign Trade in Chemicals and Allied Products During the First Quarters of 1930 and 1931*

(In thousands of dollars—000 omitted)

Item	Exports 1930	Exports 1931	Imports 1930	Imports 1931
Total	45,668	33,839	58,264	36,060
Gums, resins, naval stores	5,028	3,135	6,767	3,583
Drugs and botanicals	873	541	2,281	1,420
Essential oils	542	386	1,849	970
Sulfur, crude	2,528	1,749	.....	.....
Coal-tar products	5,593	2,592	4,712	2,729
Medicinal preparations	4,826	4,184	1,577	1,257
Industrial chemicals	9,902	8,873	6,347	4,577
Pigments, paints, varnishes	6,058	4,117	762	435
Fertilizers and materials	5,134	3,883	25,094	17,262
Explosives	614	564	2	5
Soaps and toilet preparations	3,375	2,960	1,315	631

*U. S. Dept. of Commerce

Lacquer Patents

A number of the more important lacquer manufacturers are reported as having signed an agreement arranging for the formation of the Lacquer Patents Association, the chief purpose of which is to contest the present patents of the du Pont Company relating to low viscosity nitrocellulose lacquers.

Purpose of Association

"Whereas the undersigned subscriber, in association with others and said firm of Singmaster and Breyer, is desirous of organizing an association to be hereafter designated as The Lacquer Patents Association, to collect and diffuse accurate and reliable information as to the scope and validity of said letters patent or other letters patent covering or relating to low viscosity nitrocellulose lacquers, and/or the process of making or applying same owned, controlled or assigned to others by the said du Pont, and are desirous of preventing unjust and unlawful exactions arising through the assertion of any rights under such letters patent or any of them, and are further desirous of doing such other lawful acts as may be found necessary and convenient to protect their mutual interests.

Initial Payment

Now, therefore, in consideration of the payment of five hundred dollars ($500.00) and other valuable considerations, and the mutual agreements and covenants entered into by and between the subscribers to said Association and said firm of Sing-

master and Breyer as evidenced by their signatures to duplicate copies hereof, it is agreed that said Association shall be formed and brought into operative being, and the provisions herein set forth shall become binding upon said subscribers, but only in event one hundred (100) subscribers, each representing a separate obligation as hereinafter set forth shall have executed this agreement, or a duplicate copy hereof, upon the following terms and conditions:

Administration

1. Said Association shall have an executive committee which shall act to receive and collect moneys from the subscribers thereto and hold the same in trust for the mutual interest of said subscribers, and disburse the same in such manner as shall be necessary for the full protection of the interests of the Association and the individual subscribers thereto as hereinafter set forth.

Settlement

6. It is further agreed between the subscribers hereto that no compromise, settlement or agreement of any kind, shall be entered into, either directly or indirectly, by subscribers hereto with the said duPont, assigns or licensees, in respect to any of said letters patent or letters patent relating to low viscosity nitrocellulose lacquers without the consent of the said executive committee or seventy-five per cent (75%) of all subscribers hereto in writing first obtained, provided however, that in the event of such settlement or agreement, such subscribers as shall not agree thereto shall not be bound by such action of the Association or other subscribers, and any and all information or evidence obtained or in the possession of the Association shall be available for use by the non-agreeing subscribers or any one of them for use as a defence in event of suit, and their proportionate share of the funds held by the committee after full settlement of all obligations shall be refunded.

Litigation

7. In event of suit being instituted by duPont or others against any one of said subscribers or their customers for infringement of said letters patent, said suit or suits shall be defended by and at the expense of such Association, and under the supervision of said firm of Singmaster and Breyer through attorneys and counsel appointed by them with the approval of said executive committee which defense shall be conducted with all diligence and care, and with the full resources of said Association, including evidence, testimony and expert assistance available to said Singmaster and Breyer, the Association, and all subscribers thereto, and to that end, the said Singmaster and Breyer shall assist and deliver to the Association for the purpose thereof any and all evidence and give any testimony or any other service within their power to such defense, and further provided that said subscribers shall contribute such moral support and other such assistance as may be required in such defense by the association or their attorneys.

8. It is further agreed that in event of suit being filed against any one of said subscribers or any customer thereof for infringement of said letters patent, said subscriber agrees promptly upon being advised thereof to notify the executive committee, through Singmaster and Breyer or any one of the members thereof, and thereupon place the defense of said suit entirely within the control of the Association, provided however, that the defendant in such suit may retain its own counsel and at its expense to assist in the conduct of its defense, and provided further, that any subscriber defendant in such suit shall cooperate fully with the Association in the defense thereof and lend its best aid and assistance and moral support."

THE MONTH REVIEWED

April

29 Orlando F. Weber re-elected President, Allied Chemical and Dye Corp. (627)

May

4–9 13th Exposition most successful since war period. (586)

9 Andrew W. Mellon and Richard B. Mellon receive A. I. C. Medal. (601)

13 William S. Gray appointed selling agents for Western Borax Co. (627)

14 Dept. of Commerce reports 1st quarter exports 26% below and imports 38% below 1930. (625)

14 Oil Chemists at annual meeting oppose joining A. C. S.

18 Supreme Court upholds oil conservation policy of President Hoover and holds invalid American Patent Development Corp's. patent on method of CO_2 refrigeration. (627)

20 Texas Gulf Sulphur places stock on a $3.00 basis. (635)

24 Texas Legislative raises sulfur tax to 75 cents. (626)

25 Copper Sulfate reduced to $3.90. (643)

Deaths (630)

17 Samuel W. Parr

21 E. T. Bedford

Methanol Again

The wood alcohol anti-freeze controversary flared up again with the sending by Representative L. C. Dyer (Mo.) and a member of the Committee on the Judiciary, of a letter to the Surgeon General, Dr. Hugo S. Cummings in which he openly accuses the Bureau of the Public Health Service with, "truckling to the producers of this deadly liquid" and demanding congressional action. He repeats a story that R. R. Sayers, the chief surgeon of the Bureau of Mines is being backed to succeed Dr. Cumming by a "Powerful trade group, including the companies controlling the supply of wood alcohol, both natural and synthetic."

Sulfur Tax

Just before sine die adjournment the Legislature adopted the free conference report increasing the sulfur production tax to 75c a ton from 55c.

The increased sulfur levy was the subject of heated debates in the House and Senate during the closing week of the session. As this is written there is no indication as to whether the Governor would approve the bill.

---

du Pont Buys Eastern

DuPont has become sole owner of Eastern Alcohol Corp. through purchase just completed of half interest in corporation held by Dunbar Molasses Corp., of New York, a subsidiary of United Molasses, Ltd., of England.

Eastern Alcohol was organized in 1925 with duPont Co. a very large consumer of industrial alcohol, as half owner of enterprise. Company's plant is at Deepwater Point, N. J.

Muscle Shoals

An Alabama Senate resolution has been passed authorizing Governor B. M. Miller to appoint a commission to confer with a similar commission from Tennessee, a member of the Army Engineers' Corps, and a member of the National Farm Bureau, to seek a solution of the disposition of Muscle Shoals. It is said that the Rules Committee of the Senate may report favorably on the measure.

Court Enjoins Dealer

Judge J. Harold Brennan, of the Ohio County Circuit Court, issued an injunction recently restraining Paul J. Fink, James C. Cunningham, and Paul J. Fink, Inc., from engaging in the business of importing and dealing in bronze powders, ceramic colors, chemicals or supplies.

The restraining order, was sought by the O. Hommel Company, Inc., of Pittsburgh.

Gray in Borax

William S. Gray & Co. has been appointed sole selling agents in this country for the Western Borax Co., Ltd.

This company has a borax mine which contains borax ore that is said to be of exceptional purety. The ore consists of an almost pure borate of soda and the extent of the deposit is so vast that it can hardly be calculated. The company has put down eight bores to a depth of one thousand (1,000) feet and has two million (2,000,000) tons of ore developed and in sight. This 2,000,000 tons is on forty (40) acres of ground and the company's total holdings comprise four hundred and eighty (480) acres. The formation of the deposit suggests the probability of this mine being at the apex of a huge deposit and it is quite safe to say that the entire deposit in the area of this company will contain as a minimum 25,000,000 tons and there is no way to calculate the maximum.

The ore is in the form of long, white crystals, in many cases perfectly transparent and when the underground workings, which are at about eight hundred (800) feet, are entered one has the feeling of being in a crystal palace.

The company's mine is in the Mojave Desert thirty miles from the town of Mojave and situated on the main line of the Santa Fe Railroad.

P. H. Wooten, president of Western Borax is well known in chemical circles, having been in the industry for the past thirty years, a large part of which he has spent as managing director in Japan for Brunner, Mond. The combination with Wm. S. Gray & Co. will prove of mutual benefit as the Gray organization with its 50 years of experience behind it, as manufacturers agents, is well equipped to handle the selling end.

Washington

The problem of further preventing the frightful distruction of our natural oil resources was simplified greatly when the Supreme Court upheld the oil conservation policy of President Hoover through the curtailment of oil and gas prospecting permits in a decision by Justice McReynold. The court held that the Secretary of the Interior may refuse oil and gas prospecting permits authorized by the Leasing Act of 1920.

The decision affirms the ruling of the District of Columbia Court of Appeals in suits against the Secretary of the Interior.

Effective March 12, 1929, Secretary Wilbur rejected all applications for prospecting on the public domain in line with the oil conservation policy enunciated by President Hoover. This action was contested in the four cases carried by the Supreme Court on the ground that it was unlawful for the secretary to suspend an act of Congress under which he was directed to issue permits upon application.

Dry Ice Decision

Another far reaching decision was that of the American Patents Development Corp.'s patent on a method of refrigeration of foodstuffs by carbon dioxide. It has been held invalid by the United States Supreme Court in disposing of the suit of Carbice Corp. against the American Patents Development Corp. and Dry Ice Corp.

The Dry Ice Corp. is the licensee of the American Patents Development Corp. and sells the patented device on the condition that the user of the patent shall also use the carbon dioxide manufactured by the Dry Ice Corp.

The Carbice Corp., carbon dioxide, sold its carbon dioxide to a user of the patent. Dry Ice brought an infringement suit against Carbice claiming it was contributing to the infringement of the patent. Carbice contended that the patent was invalid and even if it were valid Dry Ice could not impose such condition upon the use of its patent.

On March 9, last, Justice Brandeis rendered a decision holding that the owner of the patent could not impose that condition on the use of its patent as this would be beyond the monopoly granted under the patent. The court did not pass on the validity of the patent itself.

Immediately after this decision the Dry Ice Corp. announced that since the court had not held the patent invalid it would institute patent infringement suits against users of solid carbon dioxide manufactured by others than the Dry Ice Corp. On petition of Carbice Corp. the Supreme Court decided to reconsider its opinion and pass on the validity of the patents. (See Chemical Markets, May, page 514).

COMING EVENTS

American Chemical Society, Hotel Statler, Buffalo, August 31 and September 4.

American Institute of Chemical Engineers, Swampscott, Mass., June 10-12.

National Association of Purchasing Agents, Annual Convention, Toronto, Royal York Hotel, June 8-11.

American Society for Testing Materials, Chicago, June 22-26.

National Fertilizer Association, New Greenbriar, White Sulphur Springs, week of June 8.

The Electrochemical Society, Hotel Utah, Salt Lake City, September 2-5.

Salesmen's Association, First Golf Tournament, Canoe Brook Country Club, Summit, N. J., June 23.

An Interstate Commerce Commission examiner has recommended that the Commission cancel as unjustified, proposal of railroads to revise classification ratings on manufactured fertilizer throughout the entire country.

Examiner also urged that Commissioner find less-than-carload rates on fertilizer unreasonable in the past, but deny reparation to shippers for rates charged heretofore.

Railroads desired to cover by reclassification shipments of fertilizer in small packages for retail trade and prevent application of bulk rates.

The Interstate Commerce Commission has also held as unreasonable, unjustly discriminatory and unduly prejudicial, the present interstate container rates of the New York Central, Lehigh Valley and Pennsylvania railroads, and those proposed by the New York Central, Lehigh Valley and Missouri Pacific.

Weber Re-elected

At the meeting of the directors of the Allied Chemical and Dye Corp., held April 29, Orlando F. Weber was re-elected president and also chairman of the board. At a previous meeting of stockholders held April 27 Alfred A. Cook, Cook Nathan and Lehman, and Jacob White were elected directors. Mr. Weber was also made chairman of the executive committee with C. S. Lutkins, F. J. Emmerich and Chas. F. Weber. At the meeting on April 29 the following were also elected: G. M. Wells, F. J. Emmerich and C. F. Weber, vice-presidents; F. J. Emmerich, comptroller; Joseph N. Ford, treasurer; H. F. Atherton, secretary.

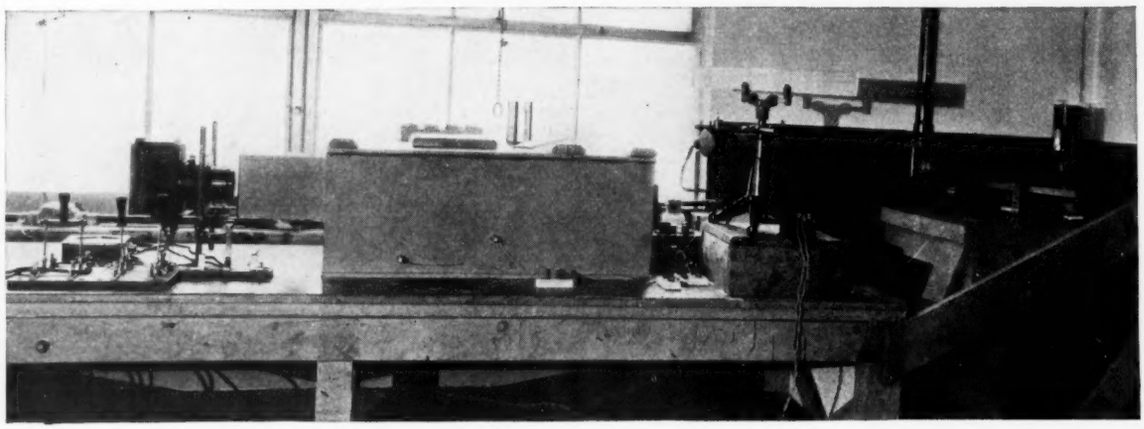
C. W. Nichols who was not re-elected as a director issued a statement denying that the Nichols family had disposed of its interest in the Allied.

Litigation

The patent infringement suit of the Commercial Solvents Co. against the Union Solvents Co. went to trial in Federal Court on May 19. The defendant is charged with infringing on the Weizmann patent covering a process for manufacture of acetone and butyl alcohol by bacteriological means. The plaintiff is the exclusive licensee under the patent.

A bill of complaint alleging infringement of United States patents relating to the manufacture and molding of synthetic resin has been filed by American Cyanamid interests against the Aldur Corp. of Brooklyn.

To tell you what is back of Hercules research in nitrocellulose lacquers. This is No. 11 of a series. Others furnished on request.



MEASURING HAZE IN NITROCELLULOSE SOLUTIONS

MEASUREMENT of haze in celluloid blocks and films and in regular nitrocellulose solutions is a part of the experimental work being carried on at Hercules laboratories. Illustrated above is a special tyndallometer developed in our laboratories in connection with research on celluloid for safety glass.

Extensive studies are being made on nitrocellulose and the ingredients with which it is used in manufacturing lacquer, celluloid, and solutions in order that we may produce:

1. A nitrocellulose best suited to other ingredients now available.
2. A nitrocellulose that will be thoroughly adapted to better or cheaper ingredients which may be developed.

The results of many of our tests and investigations are on file with our technical service division.

CELLULOSE PRODUCTS DEPARTMENT

HERCULES POWDER COMPANY
INCORPORATED

994 Market Street — Wilmington, Delaware

Standard Oil Bldg., San Francisco, Calif.
Canadian Agent, H. J. McAdie, 11 Craig Street, East, Montreal, Quebec

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WOOD ROSIN · STEAM-DISTILLED WOOD TURPENTINE · ETHYL ABIETATE · COTTON LINTER PULP

CCC-28

Van Schaack Bros. Chemical Works has developed a new lacquer plasticizer known as "Ethox" which it is suggested has improved characteristics when comparison is made with dibutyl phthalate complete specifications of physical properties and prices are now available.

Emery Industries, Inc., has announced a new form of stearic acid in the form of small flakes. The product was shown for the first time at the Chemical Exposition this year. The flakes are pure white triple pressed stearic acid.

The Edward Flash Co. long and prominently identified with the cottonseed and vegetable oil trades of the country as broker and commission merchant, is being liquidated.

Fred E. Stuart

Fred E. Stuart, who has been active in water softening and allied sanitary fields in the State of Florida for the past few years, has resigned his position with the City of Daytona Beach, Daytona Beach, Fla. to represent the Industrial Chemical Sales Co., Inc., in the sale of their NUCAR Activated Carbon for water purification.

Merck & Co., has extended for the 1931-32 academic year at Princeton the fellowship in analytical chemistry established for the preceding year. The 1931-32 fellowship has been awarded to I. C. Schoonover, fellow during the preceding year. Mr. Schoonover will continue the study of new potentiometric titration methods.

Geo. F. Taylor & Company, Inc., subsidiary of Consolidated Chemical Industries, Inc., announce the removal of their offices to 500 Fifth Avenue in New York City.

The Calco Chemical Co. of Boundbrook, N. J., a subsidiary of American Cyanamid Co., has acquired the National Ultramarine Co., of Norwood, Ohio. National was one of the three largest producers of ultramarine blue pigment for the paint trade. Acquisition was effected through an exchange of stock.

Company News

Neutrasol Products Corporation announce the removal of their offices from 41 Park Row, N. Y. to the new factory at 39 Cornelison Avenue, Jersey City, New Jersey.

Manufacture of liquid gas, one of the more recent developments of the oil industry, and the distribution of the product in tank car and tank truck lots, is now being undertaken by the Union Oil Co.

The Western Cartridge Co. is charged with intimidating customers of E. I. du Pont de Nemours & Co. and with purposely refraining from bringing patent suit against the company in the hope that some material witnesses may die or be beyond jurisdiction of the court, in a bill of complaint filed by the du Pont company in the United States District Court at Wilmington.

The annual golf tournament of the employees of the American Cyanamid Co. and its subsidiary units was held May 16 at the Blue Hills Country Club, Orangeburg, N. Y. Henry C. Little, of the Cyanamid, won a cup donated by the company's golf committee for low score with a net of 61. The president's cup, donated by W. B. Bell, was won by the team representing A. Klipstein which was composed of J. L. Schroderer, H. C. Klipstein, A. Scharwachter and M. J. Wixson. The "kickers" handicap was won by George Barsky of the Cyanamid company's Warners, N. J., plant.

Ledoux and Co., weighers, samplers and assayers of ores and metals, have moved to new and greatly improved quarters at 155 Sixth Avenue, where a fine, modern laboratory has been installed.

The world's first pound of one of the rarest metals, indium, has now been made electrolytically by the Grasselli Chemical Co. in Cleveland, Ohio. It is understood that it is valued at $7,000, nearly ten times the cost of platinum. The metal was on display at the recent Exposition.

E. C. Klipstein & Sons Co., Inc. announce the removal of their executive offices to Empire State Building, Fifth Avenue at 34th Street, New York City.

The American Plastics Corp., with offices at 50 Union square, New York City, has been formed by the consolidation of three manufacturers of casein plastics, the Erinoid Co. of America, a subsidiary of the Borden Company; the Karolith Corp., and the Panaplastics Corp., a subsidiary of the Heyden Chemical Corp.

E. M. Sergeant Co. has also joined the procession to the Empire State Building in New York.

Equipment

Stephens-Adamson Mfg. Co., conveyor and screen manufacturers of Aurora, Illinois, have enlarged their Chicago office and moved to new quarters in the Civic Opera Building at 20 North Wacker Drive. C. H. Adamson, Secretary of the firm, will be in direct charge of sales and engineering for the Chicago territory.

A confidence in the growing importance of Chicago as a manufacturing center is given as the reason for the increased sales and engineering staff.

C. H. Adamson, the new District Manager, is well known in the district, having been director of all Stephens-Adamson advertising and sales promotional work for many years. He is a graduate of Carnegie Institute of Technology and an Engineer of experience and unquestioned ability.

S. M. Kintner

S. M. Kintner, who has been Assistant Vice-President of the Westinghouse Electric and Mfg. Co., was elected Vice-President in Charge of Engineering for that company at a recent meeting of the Board of Directors (held April 29). He succeeds W. S. Rugg, who has been elected Vice-President in Charge of Sales.

He is a member of the American Institute of Electrical Engineers, American Physical Society, Engineers Society of Western Pennsylvania, Institute of Radio Engineers, National Research Council, The Franklin Institute, Edgewood County Club, and The Sigma Chi Fraternity.

Link-Belt Co. announce the appointment of Mr. William L. Hartley as District Sales Manager in charge of the Detroit territory.

With the cooperation of International Nickel, Lukens Steel, has developed a new product, a hot-rolled bi-metal of pure Nickel and Steel, which is being marketed under the trade name, Lukens Nickel-Clad Steel Plate.

Obituaries

E. T. Bedford

The death of E. T. Bedford, president of Corn Products Refining Company at the advanced age of 82 years, removes from the industry one of its outstanding figures.

Mr. Bedford had been connected with corn products manufacture for over thirty years and had been the directing genius of Corn Products Refining Company since its organization in 1906 as an amalgamation of several corn refining companies.

E. T. Bedford

Mr. Bedford's first business experience was gained with the Standard Oil in association with the pioneers of the oil industry—John D. Rockfeller, H. H. Rogers and the Pratts. Mr. Rogers once declared that Mr. Bedford was the greatest salesman of oil products Standard had ever known.

Outside of business he found an outlet for his activities at Westport, Conn. where he developed the 200-acre Green's Farms and followed the hobbies of flower growing, Jersey cattle breeding and the training of fast trotting horses, which on many occasions he drove himself at amateur race meets. He also took an active interest in the schools, hospitals and philanthropies of Westport, being a heavy contributor to building and maintenance funds.

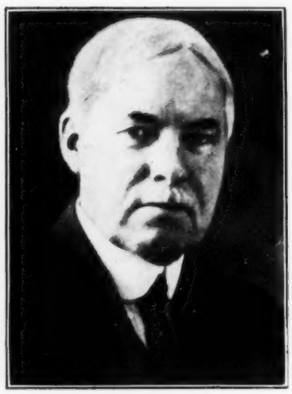
He was director of many corporations, among them being Corn Products Refining Company, Title Guarantee & Trust Company, Bush Terminal Company, Cavanagh-Dobbs, Inc., and U. S. Merchants & Shippers Insurance Company.

He is survived by his widow, two married daughters and two sons, one of these being F. T. Bedford, president of Penick & Ford, Ltd., Inc.

Dr. Samuel W. Parr

Dr. Samuel W. Parr, Emeritus Professor of Applied Chemistry of the University of Illinois, died of heart disease at his home in Urbania on May 17. He was 74 years old.

Professor Parr was widely known for his work in the field of applied chemistry. His process for coking Illinois coal, known as the "Parr low temperature process," is considered one of the great achievements of the university. He also perfected the new metal "illium," which can be substituted for platinum in many instances.



Dr. S. W. Parr

Professor Parr devised the Parr calorimeter for determining the heat value of coal and other hydro-carbons. It is widely used in the United States and Europe. He also invented a new type of calorimeter for determining and recording the heat value of combustible gases. "Illium," the metal which he named after the University of Illinois, is credited with important industrial economies through the effectiveness of its acid-resisting properties in prolonging the life of boilers.

In April, 1926, the Chandler Medal was awarded to Professor Parr by Columbia and in December, 1927, he was elected president of the American Chemical Society for the ensuing year.

Thomas T. Gray

Thomas Tarvin Gray, president of the Gray Laboratories, Inc., Newark, N. J. and internationally known as a petroleum technologist and inventor of petroleum refining processes, died April 28 of pneumonia at his home in Elizabeth, N. J.

Edmund S. Nash

Edmund Strudwick Nash, former president of the Rosin and Turpentine Export Company, subsidiary of the American International Corporation, died April 27 of heart disease at his home in New York City.

"Cosach" Additions

The stockholders of the following nitrate companies have voted to join the Compania de Salitre de Chile (Cosach): The Galicia Nitrate Co., the Commercial & Nitrate Co. of Tarapaca, the El Loa Nitrate Co., the Astoreca Nitrate Co., and the Nitrate & Railway Co. of Agua Santa.

These new adhesions give Cosach a control of the total nitrate production of Chile, the legal requisite to enable the company to start operations.

Personnel

Russell R. Brown, who resigned as president of the United States Industrial Alcohol Co. early in January, has been elected chairman of the board of directors of the American Commercial Alcohol Corp. An announcement by the company states that Mr. Brown has acquired a substantial stock holding in the American Commercial Alcohol and that he will devote a considerable portion of his time to its affairs.

Russell R. Brown

Mr. Brown is a well-known figure in the alcohol industry. He had been associated with the United States Industrial Alcohol for thirteen years, beginning his service in November, 1917, and continuing until the end of 1930.

A. L. Opper, sales manager for the American Commercial Alcohol Corp., has been elected vice-president of the company.

Lloyd Van Doren has established an office in association with Watson, Bristol, Johnson & Leavenworth, 6 East 45th Street, New York for general practice in chemical and chemical patent problems and patent causes, including consulting, soliciting and expert testimony.

John B. Swift, former president of Eagle Picher Lead Co., has resigned as chairman and director. No action has been taken to fill the vacancy. Mr. Swift recently filed a deed of assignment.

John McE. Sanderson, has joined the sales personnel of the American Cyanamid Co. as technical assistant. Mr. Sanderson will specialize in work on synthetic resins, lacquer solvents and nitrocellulose.

At the annual meeting of the Atlantic Refining Co., John D. Gill was elected a director to fill a vacancy. Other directors were reelected.

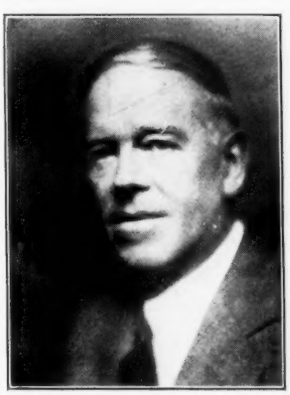
At the organization meeting of the board, J. W. Liberton, and E. J. Henry were elected additional vice-presidents. Other officers were reelected.

Dorr and Oliver Unite

Mr. John Van Nostrand Dorr and Mr. Edwin Letts Oliver have announced a union of the businesses and assets of The Dorr Co. and Oliver United Filters, Inc. This union was brought about on June 1st by the formation of a new company, to be known as Dorr-Oliver Corp., under the joint management of Messrs. Dorr and Oliver.

J. V. N. Dorr

The businesses of the two uniting companies are of long standing and complementary. Dorr occupies a leading position in the fields of agitation, classification and sedimentation through its equipment, built up around the original inventions of its founder, and the Oliver United Filters Inc. occupies a similar position in the field of filtration through the inventions of E. L. Oliver and E. J. Sweetland. The union should, therefore, make it possible to offer to industry a more complete line of equipment and engineering service than either company could hope to offer individually.



Edwin L. Oliver

Dorr-Oliver Corp., will function through its two, wholly-owned operating units, a new Dorr Co., Inc., and a new Oliver United Filters Inc. Mr. Dorr and Mr. Oliver will head their respective companies and with the aid of their present executive and technical staffs, will continue on behalf of Dorr-Oliver Corp., the businesses which they have individually initiated, organized and expanded so successfully in the past.

At the regular annual meeting of the Directors of The Roessler & Hasslacher Chemical Company, Inc. in New York City, April 27, the following officers were elected to serve for the ensuing year: Chairman of the Board, W. F. Harrington; President, Hector R. Carveth; Vice-president, Mortimer J. Brown; Vice-president and Secretary, Colby Dill; Vice-President, Milton Kutz; Vice-President, E. A. Rykenboer; Treasurer, Albert Frankel; Asst. Treasurer, August Heuser; Asst. Secretary, M. D. Fisher; Asst. Secretary, E. A. Howard; Asst. Secretary, J. Carlisle Swaim.

American Potash

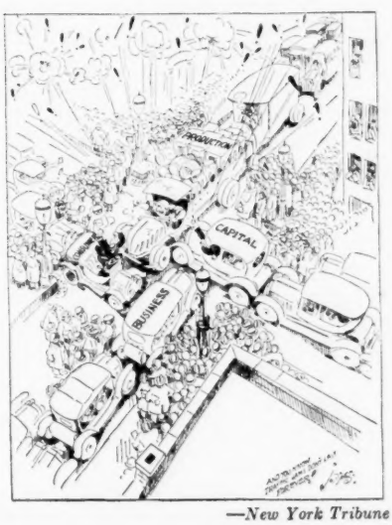
The United States Potash Co. has enlarged its plans for mining potash in the Carlsbad district of New Mexico. The daily capacity of the plant will be 5,000 tons of potash instead of 1,000 tons as originally proposed. The potash bed is shown by exploration work to be extensive, and mining operations will be started as soon as the shaft is completed.

Freeport Takes Control

Freeport Texas Co. has assumed control of the management of Cuban American Managnese Corp. through election of nine Freeport Texas directors to the Cuban American Manganese board. The Cuban company now has 15 directors. Freeport Texas recently acquired a large interest in Cuban American, which controls 10,000 acres of Manganese properties in Cuba, located about 10 miles north of the port of Santiago.

Directors of Freeport Texas elected to the board of the Cuban company were: George Gordon Battle, E. G. Diefenbach, Monro B. Lanier, Lindley C. Morton, E. L. Norton, O. R. Seagraves, John Hay Whitney, Langbourne M. Williams, Jr., and Frank A. Wills.

This Isn't Depression, It's a Traffic Jam



—New York Tribune

Personal

Gregory Mangin, one of America's tennis stars and son of J. J. Mangin, of the United Color and Pigment Co., Newark, N. J., has been named by the United States Lawn Tennis association as a member of the Davis Cup team of four, to meet Canada in the finals of the North American zone play.

Mr. R. I. Wishnick, president of Wishnick-Tumpeer, Inc. and its subsidiary companies, St. Louis Sulphur & Chemical Co. and the Century Carbon Co., is in Europe for a combined business and pleasure trip. He sailed on April 25th aboard the Ile de France, accompanied by Mrs. Wishnick.

George W. Merck, president of Merck & Co., sails with Mrs. Merck, on the "Aquitania," May 5, for an extended trip to Europe.

J. R. Schmertz, advertising manager, Mathieson Alkali has been elected first vice-president of the Technical Publicity Association.

The team representing Colgate-Palmolive-Peet Co. finished in first place in the bowling tournament of 1930-1931 conducted by the Wholesale Drug Trade Bowling Association of New York, with 32 wins and 16 losses. The E. R. Squibb & Sons team was in second place with 28 wins and 20 losses, having a chance to tie the soap makers' team up until the final session on April 13.

Leon V. Quigley, Technical Editor of Bakelite Corp., gave a series of lectures before audiences in St. Louis, and Cleveland, during the week of May 10th on, "Bakelite in Industry" and, "Replacing Metals by Synthetic Resins."

Horace Bowker, President of American Agricultural Chemical delivered two addresses recently, the first over WJZ and the Blue Network on May 4 on "What Every Farmer Wants" and the other at the luncheon of the National Foreign Trade Convention, May 27.

New Penn. Salt Director

Leonard H. Kinnard president of Bell Telephone Co. of Pennsylvania, was elected a director of Pennsylvania Salt Co. to fill the vacancy caused by the resignation of Miers Bush.

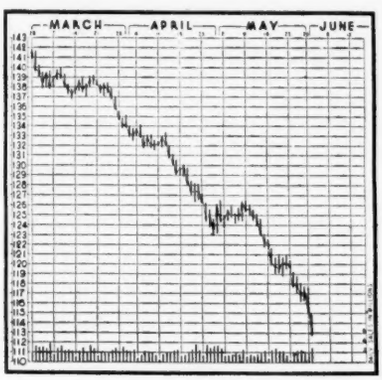
W. W. Atkinson, general purchasing agent, Chas. Pfizer & Co., and Charles P. Haffey, in charge of foreign shipments, were honored for their 25 years of service at a dinner at the Hotel Paramount on May 26.

The Financial Markets

Stock Values Drop to New Lows—Texas Gulf Sulfur on $3 Basis—Blaw-Knox Declares Regular Dividend—Commercial Solvents Earns 21 Cents a Share for First Quarter.

Except for the first few days of May the month was one of severe decline and further liquidation of stocks. The depreciation in value was the largest since September, eight months ago. No particular reason or set of reasons could be assigned other than the lack of definitely encouraging news of early business revival and a feeling of pessimism on the part of investors towards common stocks in the wave of reduced dividends. Foreign news was very disconcerting and added to the general feeling of despondency.

General Market Trend



—*N. Y. Herald-Tribune*

Drop in Values

Values of 240 issues, as announced by the New York Times, comprising 20 groups of stocks depreciated $3,782,578,527. In April the loss was $2,972,598,891 and in May 1930, $471,348,967. The total loss since the end of the bull market in September, 1930 has been $31,621,395,778 for the same 240 issues. Only seven months out of the past 20 have witnessed advances in the values.

Chemical Co. Losses

In the chemical group the loss during the past month amounted to $240,032,633 as against $94,064,186 for the same period a year ago. This loss was exceeded by the losses in food, motors, oils, public utilities (which suffered the greatest drop) and steels. The declines in stock values of a few of the larger chemical companies are as follows:

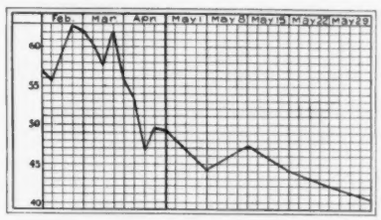
Air Reduction	$7,676,761
Allied Chemical	46,810,686
Comm Solvents	6,008,651
Davison	1,512,201
Du Pont	91,291,678
Freeport Texas	3,648,915
Math Alkali	1,300,780
Texas Gulf Sulphur	13,019,550
Union Carbide	78,381,917
U. S. Ind. Alcohol	1,588,837

Chemicals Reach New Lows

Each one of the representative stocks given below showed a large loss in the five week period between April 25 and May 30. Allied Chemical and Dye rallied in the second week of the month from a low of 118 to 126½ but then followed the general course of the market to close at the end of the month at a new low of 105. The copper stocks were very weak throughout the period due to further weakness in the price and the reduction in the dividend rate of several of the operating companies.

Several of the chemical companies made important changes in the dividend rate during the month and this undoubtedly contributed to the weakness in the group. Texas Gulf Sulphur has placed its stock on a $3 basis as against the $4 previously paid. International Agricultural omitted the quarterly dividend of $1.75 on the prior preferred stock while United Carbon passed the semi-annual dividend of $3.50 due this time on the 7% participating non-cumulative preferred stock.

Chemical Markets Av. Price



The Chemical Markets Average Price based on twenty representative industrial chemical common stocks reached a new low in May. The average price for the past several weeks stood at 49.30, April 24; 44.64, May 1; 47.37, May 8; 44.35, May 15; 42.39, May 22; 40.27, May 29.

New Foamite Plan

Holders of $2,534,000 par value of the outstanding $3,089,000 five year 5½% gold notes due June 1, 1931, of American-La France and Foamite Corp. have deposited or pledged their notes with a committee of directors of the corporation under an exchange and extension plan. The plan proposes the exchange of new five-year 5½% notes due June 1, 1936, for the old notes and the payment of a cash premium of 2½% on the par value of the principal of the old notes deposited as well as the interest on the old notes due June 1, 1931.

Kennecott Dividend

Kennecott Copper Corp. has reduced the dividend rate on the common stock to a $1 annual basis, declaring a quarterly payment of 25c a share. Small sales of copper in recent months at lower prices forced another reduction of the dividend. The company's earnings statement for the year 1930 reflected the difficulties the copper industry has had to face, showing per share earnings of $1.66 before depletion and inventory adjustments. Against this was paid in dividends during the year $3.75 a share.

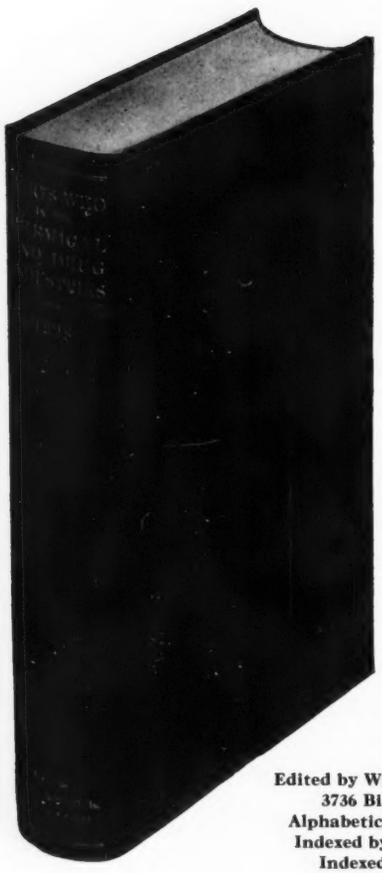
Colgate Expansion

The Colgate Palmolive Peet Co. has purchased for $3,000,000 cash the Omega Chemical Co. of New York, which controls Omega, Ltd., of London and Societe Cadum of France and the Societe Cadum Belge. The purchase was made from the estate of Michael Winburn and cash was obtained through the sale of $8,000,000 of preferred stock.

Price Trend of Chemical Company Stocks

Name	*April 25*	*May 2*	*May 9*	*May 16*	*May 23*	*May 30*	*Net Change*
Allied Chem	133¼	118	126½	118	113½	105	—28¼
Air Reduction	85	81	88¼	82	76	74¼	—10¾
Anaconda	30	27½	28¾	26½	21½	22¾	— 7¼
Columbian Carbon	76¼	68	75	65½	66	62	—14¼
Comm. Solvents	14½	13½	14⅛	13	12⅛	11⅜	— 3⅛
DuPont	85	81	86⅛	82½	78	74¾	—10¼
Standard of N. J.	37⅝	36¾	38⅛	35¼	34¾	33	— 4⅝
Texas Gulf	43⅜	37⅛	41½	41¼	39⅛	35½	— 7⅛
U. S. I.	34	33¼	32¼	30⅝	26¾	28¾	— 5¼

WHO'S WHO
in the
CHEMICAL & DRUG INDUSTRIES



Edited by Williams Haynes
3736 Biographies
Alphabetically arranged
Indexed by Companies
Indexed by Cities
437 pages
Bound in blue cloth

IN THIS handsome volume are the personal records and industrial achievements of the big men of the chemical and drug fields: the responsible executives in office, plant, and laboratory throughout all branches of these industries. Here you will find your associates, your business friends and competitors, your customers and prospective customers---a book of fascinating personal interest and of great practical usefulness for reference. "Exciting as a detective story." "Priceless for its personal background." You need your own copy of this Who's Who, and we suggest you take advantage of the special money-saving offer.

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Position_____

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Over the Counter Prices

Company	Bid	Asked
Am. Hard Rubber	20	30
Baker, J. T. Chem	10	14
Dixon Crucible	128	138
Dry Ice	27	32
Merck, pfd	72	76
Solid Carbonic	7¼	9¼
Tubize Chat. pf	36	42
Worcester Salt	87	92

Closing prices, Friday, May 30.

The board of directors of Diamond Match Co. has appropriated funds for the erection of a large chemical plant for the manufacture in this country of certain prime chemicals used in match manufacture.

United Chemical Elects

At a meeting of the Board of Directors of United Chemicals, Inc. the following officers were re-elected to serve for the next year: W. B. Thom. president; A. M. Pitcher, vice-president; Louis Neuberg, vice-president; M. E. Gilbert, Secretary-treasurer.

New Monsanto Officers

Monsanto Chemical Wks. has declared the regular quarterly dividend of 31¼ cents payable July 1 to stockholders of record June 10.

Officials stated that second quarter earnings should be at least as much as in first quarter, when net profit was $255,378, after charges and taxes, equal to 59 cents a share on 429,000 shares of capital stock outstanding. This indicates that net profit for first six months will come close to covering annual dividend requirements of $1.25 per share. In first six months of 1930, net profit was $622,397, or $1.50 on the 410,307 shares of stock.

Charles Belknap, president of Merrimac, has been elected executive vice-president of Monsanto and William M. Rand, vice-president of Merrimac, was elected a director of Monsanto to succeed Philip Stockton, who remains a director of the Merrimac company.

New Highs and Lows

The number after the name designates the number of times new highs or lows were registered during the month.

High

Colgate-Palmolive-Peet.. United Dyewood....2
Vulcan Det. Pfd.....

Lows

A A C Del.....6	Hercules Powder.....3
Air Red.....3	Pfd.....2
Allied Chem.....6	Internat'l Agri.....5
Amer. Smelting.....13	Pfd.....8
Amer. Sol & Chem.....13	Internat'l Salt.....
Pfd.....	Liquid Carbonic.....
Anaconda.....9	Mathieson.....3
Archer Daniels.....	Newport.....2
Atlantic Ref.....	Proctor & Gamble....
Atlas Powder.....7	Shell Union.....3
Atlas Powder Pfd.....	Standard of Calif....2
Colgate-Palmolive-Peet.2	Standard of N. J.....4
Columbian Carbon.....5	Standard of N. Y.....5
Corn Solvents.....2	Texas Gulf Sulphur..3
Davison Chem.....3	United Carbide.....3
Dev. R. Pfd.....3	United Carbon.....
Dupont.....3	U. S. Indus. Alcohol..3
Eastman Kodak.....6	Vanadium.....5
Freeport Texas.....4	Va. Car Chem.....
Glidden Pfd.....	6% Pfd.....4

LOWS FOR EQUIPMENT CO.'S

Link-Belt.....5 Oliver Filters Pfd....2

Dividends and Dates

Company	Stock on record	Dividend	Payable
Allied Chem pf	June 11	$1.75	July 1
American Metal pf	May 21	$1.50	June 1
Amer. Smelt cum pf	May 8	$1.75	June 1
Amer. Smelt 2nd pf	May 8	$1.50	June 1
Atl. Refining	May 21	.25	June 15
Atlas Pow	May 29	$1.00	June 10
Carman Class A	May 15	.50	June 1
Colgate-Palm. pf	June 10	$1.50	July 1
du Pont	May 28	$1.00	June 15
du Pont deb	July 10	$1.50	July 25
Eastman Kod	June 5	$1.25	July 1
Eastman Kod., pf	June 5	$1.50	July 1
Eastman Kod. ext	June 5	.75	July 1
Freeport Texas	May 15	.75	June 1
Hercules Powder	June 12	.75	June 25
Int. Nickel	June 1	.15	June 30
Koppers Gas-Coke pf	June 11	$1.50	July 1
Monroe Chem. pf	June 15	.87½	July 1
Monsanto	June 10	.31¼	July 1
Newport	May 23	.25	June 1
Newport A	May 23	.75	June 1
Stand. N. J.	May 16	.25	June 15
Texas Gulf Sul	June 1	.75	June 25
Va Car pf	May 26	$1.75	June 1
Westvaco	May 15	.50	June 1
Equipment			
Blow-Knox	May 18	.37½	June 2
Foster Wheeler	June 12	.50	July 1
Foster Wheeler pf	June 12	$1.75	July 1
Ingersoll-Rand	May 9	$1.00	June 1
Ingersoll Rand pf	June 8	$3.00	July 1
Link Belt	May 15	.60	June 1

Rights	Books Close	Privilege Expires
Alum Std.	Dec. 15	July 2

Dividends

Eastman Kodak Co. has declared usual extra dividend of 75 cents on common stock, in addition to regular quarterly dividend of $1.25 on common and $1.50 on preferred, all payable July 1 to stock of record May 29.

Pure Oil Co. has declared the regular quarterly dividends of $1.25 on the 5¼% preferred, $1.50 on the 6% preferred and $2 on the 8% preferred stocks, all payable July 1, to stock of record June 10.

C. B. Watson, vice-president of Pure Oil Co., has been elected a director to serve out the unexpired term of W. W. Mills, deceased.

E. I. du Pont de Nemours & Co. declared the regular quarterly dividends of $1 on the common and $1.50 on the debenture stocks. The common dividend is payable June 15 to stock of record May 28 and the debenture on July 25 to stock of record July 10.

United Carbon Co. have omitted the semi-annual dividend of $3.50 due at this time on the 7% participating non-cumulative preferred stock, of which 18,578 shares of $100 par value were outstanding at the close of last year. Action was taken due to the fact that earnings were not sufficient to cover preferred dividend requirements and in order to conserve cash for the drilling program in Kentucky field in connection with the contract with Columbia Gas & Electric Co.

Union Carbide & Carbon Corp., has declared regular quarterly dividend of 65 cents a share payable July 1 to stock of record June 2.

Texas Gulf Sulphur Co. has declared a quarterly dividend of 75 cents, placing stock on $3 annual basis, against $4 previously, payable June 15 to stock of record June 1.

At a meeting of the Board of Directors held May 4 a dividend of 50c per share was declared on the Common Stock of Westvaco Chlorine Products Corp., payable June 1st, 1931 to the stockholders of record at the close of business May 15th, 1931, being the tenth quarterly dividend.

At a meeting of the Board of Directors of United Chemicals, Inc. held May 4, a dividend of 75c per share was declared on the Preferred Stock of United Chemicals, Inc. payable June 1st, 1931 to the stockholders of record at the close of business May 15th, 1931.

The Board of Directors of Atlas Powder Co. at a meeting held May 6, declared a dividend of $1.00 per share on the no par value Common Capital Stock, payable in cash June 10, 1931, to stockholders of record at the close of business on May 29, 1931.

International Agricultural Corp. has omitted the quarterly dividend of $1.75 on the prior preferred stock due at this time.

Patterson-Sargent Co. has declared the regular quarterly dividend of 50 cents on the common stock, payable June 1 to stockholders of record May 15.

Spencer, Kellogg & Sons has declared the regular quarterly dividend of 20 cents on the common stock, payable June 30 to stock of record June 15.

McKesson & Robbins, Inc., has declared the regular quarterly dividends of 25 cents on the common stock and 87½ cents on the preferred, both payable June 15 to stock of record June 5.

Equipment Companies

Ingersoll-Rand Co., has declared regular quarterly dividend of $1 on the common stock, payable June 1 to stock of record May 9. At the April meeting in 1930 a $1 extra dividend was declared and again at the October meeting.

Blow-Knox Co. has declared the regular quarterly dividend of 37½ cents, payable June 2nd, to stock of record May 18th.

Foster Wheeler Corp. has declared the regular quarterly dividends of 50 cents on common stock and $1.75 on preferred stock, both payable July 1 to stock of record June 12.

Company Reports

Atlas Powder Earns $157,291

Atlas Powder Co. reports for quarter ended March 31, 1931, net income of $157,291 after depreciation, federal taxes, etc., equivalent after dividend requirements on 6% preferred stock, to 4 cents a share on 261,438 no-par shares of common stock. This compares with $350,697 or 83 cents a share on common in first quarter of 1930.

Consolidated balance sheet of Atlas Powder Co. and subsidiaries, as of March 31, 1931, compares as follows:

	1931	1930	1929
Assets			
Prop plant and equipt	$15,183,822	$14,990,931	$14,396,343
Cash	2,016,694	1,617,138	1,565,169
Collateral loans	200,000	1,300,000	4,000,000
Emp stock subs	565,224	.....	.....
Notes & accts rec	3,050,817	3,236,270	3,731,295
Inventories	2,806,530	3,875,748	4,116,945
Market security	*2,726,696	3,787,350	1,427,752
Goodwill, patents, etc	3,135,790	2,875,243	2,875,235
Secur affil companies	3,795,470	1,951,782	1,816,022
Deferred items	205,513	302,051	266,973
Total	$33,688,556	$33,936,513	$34,195,743
Liabilities			
Preferred stock	$9,860,900	$9,000,000	$9,000,000
†Common stock	8,714,625	8,714,625	8,714,625
Accounts payable	543,949	579,186	657,773
Accrued federal taxes	114,169	272,994	617,319
Dividends accrued	98,609	90,000	90,000
Purchase money notes	.....	100,000	150,000
Res for depr contg etc	6,252,934	6,521,216	6,830,650
Surplus	8,103,370	8,658,492	8,135,367
Total	$33,688,556	$33,936,513	$34,195,734

*Includes 1,716 shares of preferred and 1,820 shares of common stock of Atlas Powder Co. at cost. †Represented by 261,438 no-par shares.

Commercial Solvents 1st Quarter Off

Commercial Solvents Corp. reports for quarter ended March 31, 1931, net profit of $537,544 after depreciation, interest, federal taxes and reserves, equivalent to 21 cents a share on 2,529,873 shares of no-par common stock. This compares with $750,492 or 30 cents a share on 2,481,232 shares in the first quarter of 1930.

Income account for quarter ended March 31, 1931, compares as follows:

	1931	1930	1929	1928
Oper profit	$690,284	$915,029	$1,129,641	$731,688
Other income	23,873	67,970	47,772	15,102
Total income	$714,157	$982,999	$1,177,413	$745,790
Charges	18,451	26,428	119,065	58,617
Fed tax, etc	58,162	*206,079	213,993	112,447
Reserves	100,000	.....	.....	.....
Net profit	$537,544	$750,492	$844,355	$575,726

*Includes provision for contingencies and inventory adjustments.

Columbian Carbon Co's Consolidated income account for quarter ended March 31, 1931, as follows:

	1931	1930	1929	1928
Net af fed tax	$965,850	$1,254,976	$1,598,369	$1,031,338
Dpr and depl	408,652	390,038	466,566	360,503
Apl min int	*3,303	54,933	71,846	.....
Net income	$560,501	$810,005	$1,059,957	$670,835
Dividends	.....	701,893	571,680	402,131
Surplus	.....	$108,112	$488,277	$268,704

*Credit.

Penick & Ford, Ltd., Inc., and subsidiaries, report for quarter ended March 31, 1931, profit of $347,447 after depreciation, etc., but before federal taxes comparing with $616,427 in first quarter of 1930, after deducting $39,561 premium paid on stock purchased and called for retirement.

Consolidated income account for quarter ended March 31, 1931, compares as follows:

	1931	1930	1929	1928
Gross	$1,152,172	$1,404,283	$1,579,577	$1,041,851
Expenses	639,652	†621,272	788,522	509,629
Depreciation	165,073	166,584	166,284	173,038
Interest	.....	.....	30,606	47,983
*Profit	$347,447	$616,427	$594,165	$311,201

*Before federal taxes. †Includes premium paid on preferred stock purchased for retirement amounting to $39,561.

Std. of N. J. Report Unfavorable

Standard Oil Co. of New Jersey and affiliated companies for year ended December 31, 1930, shows net profit of $42,150,662 after taxes, depreciation, depletion, amortization, interest and proportion applicable to minority interests, equivalent to $1.65 a share (par $25) on 25,518,468 shares of capital stock. This compares with $120,912,794 or $4.75 a share on 25,418,968 shares in 1929.

After payment of $50,929,686 in dividends there was a deficit of $8,779,024 in 1930 comparing with surplus of $74,393,090 after distribution of $46,519,704 in dividends in 1929.

Current assets including $46,657,382 cash, and $179,168,907 marketable securities at cost totaled $730, 86,691 on December 31, last, comparing with $783,188,259, including $27,615,991 cash, and $214,370,098 marketable securities at end of 1929, while current liabilities were $169,093,894, against $170,109,461.

Consolidated income account of Standard Oil Co. of New Jersey and affiliated companies for year 1930, compares as follows:

	1930	1929	1928
Gross oper inc	$1,381,879,279	$1,523,386,464	$1,302,779,121
Costs & expenses	1,231,757,248	1,278,865,858	1,075,101,964
Taxes	29,453,535	37,055,419	35,422,708
Depr, depl, amort etc	84,221,403	79,543,059	75,219,689
Net oper inc	$36,447,093	$127,922,128	$117,034,760
Other income	29,394,724	26,075,571	17,361,078
Total income	$65,841,817	$153,997,699	$134,395,838
Interest, etc	8,903,147	9,087,551	8,533,242
Profit	$56,938,670	$144,910,148	$125,862,596
App to min int	14,788,008	23,997,354	17,376,910
Net profit	$42,150,662	$120,912,794	$108,485,686
Com dividends	50,929,686	46,519,704	36,583,116
Deficit	$8,779,024	*$74,393,090	*$71,902,570
P & L surplus	549,252,775	549,223,219	478,043,454

*Surplus.

United Chemicals, Inc. show earnings of $40,315.27 after provision for dividends on Preferred Stock. These earnings are comparable with $56,390.43 for the first quarter of 1930. Total current assets at the end of 1931 amounted to $3,514,989.54 against current liabilities of $424,920.97. These figures are comparable with current assets at the end of 1930 of $4,242,053.73 and current liabilities of $245,029.84.

Earnings at a Glance

Company	Annual Dividend	Net Income 1930	Net Income 1929	Comon Share Earnings 1930	Comon Share Earnings 1939
Anaconda Copper	$1.50	$18,362,275	$69,115,729	...	$7.83
Amer. A.G. Chem. Corp. Year, Mar. 31	m	2,322,952	2,088,442	b$.30	b$.27
Asso Rayon Corp.	f	795,529	1,611,378	p3.97	.34
Chile Copper	1.50	8,250,905	21,821,932	1.86	4.94
Standard Chemical Year, Mar. 31	....	18,608	135,799	.50	3.64
Standard Oil of Indiana	2.00	46,371,438	*.....	2.73	....
Standard Oil of New Jersey	§$1.00	$42,150,662	$120,912,794	h$1.65	h$4.75
First Quarter		*1931*	*1930*	*1931*	*1930*
Air Reduction	§$3.00	$1,019,040	$1,523,276	$1.21	$1.98
Amer. Commercial Alcohol	f	$124,837	$175,349	h$.33	h$.45
American Metal	f	108,390	773,372	....	.77
Atlas Powder	4.00	157,291	350,697	.04	.83
Carman & Co.	m	46,143	68,564	b.35	b.66
Certain-Teed Products Corp.	f	†233,892	†550,564	....	....
Columbian Carbon Co.	5.00	560,501	810,005	1.04	1.62
Commercial Solvents Corp.	1.00	537,544	750,492	h.21	h.30
Consol. Chemical Industries	a1.50	116,095	127,150	c.41	c.45
du Pont	4.00	12,656,929	17,347,626	j1.01	j1.52
Hercules Powder	3.00	216,459	731,535	h.03	h.88
Monsanto Chem.	1.25	255,378	293,170	h.59	h.72
Newport Co	1.00	240,931	426,017	h.41	h.82
Union Carbide Carbon	2.60	4,613,670	6,472,783	h.51	h.72
Inter. Nickel	.60	1,659,637	4,616,144	h.08	h.30

*Not available. †Net loss. bOn Class. B stock. dDeficit. eProfit before depreciation. fNo common dividend. hOn shares outstanding at close of respective period. mNo Class B dividends. pOn preferred stock.

Hercules' Quarter Below 1930

Hercules Powder Co. reports for quarter ended March 31, 1931, net profit of $216,459 after depreciation, federal taxes, etc., equivalent after dividends on 7% preferred stock, to 3 cents a share on 606,234 shares of no-par common stock. This compares with $731,535, or 88 cents a share, on 598,000 common shares in first quarter of 1930.

Income account for quarter ended March 31, 1931, compares as follows:

	1931	*1930*	*1929*	*1928*
Gross	$5,140,930	$6,865,889	$8,438,926	$7,107,972
*Net profit	216,459	731,535	939,046	797,038
Pfd divs	199,921	199,921	199,922	199,922
Com divs	452,309	448,500	448,500	448,500
Deficit	$435,771	†$83,114	†$290,624	†$148,616

*After depreciation, federal taxes, etc. †Surplus.

International Nickel Co. of Canada, Ltd., and subsidiaries for quarter ended March 31, 1931, shows net profit of $1,659,637 after depreciation, depletion, interest and federal taxes, equivalent, after dividend requirements on 7% preferred stock, to 8 cents a share on 14,584,025 no-par shares of common stock. This compares with $4,616,144, or 30 cents a share on 13,758,208 shares in first quarter of 1930.

Consolidated income account for quarter ended March 31, 1931, compares as follows:

	1931	*1930*	*1929*
Earnings	$3,238,406	$6,619,806	$7,391,660
Other income	15,975	297,133	469,048
Total income	$3,254,381	$6,916,939	$7,860,708
Expenses	374,494	447,271	527,729
Fed taxes	145,910	582,958	748,698
Depr. depl, etc.	954,476	1,144,788	889,839
Interest	119,864	125,778	104,251
Net profit	$1,659,637	$4,616,144	$5,590,191
Preferred divs	483,484	483,475	589,876
Common divs	2,186,792	3,438,877	2,749,147
Deficit	$1,010,639	*$693,792	*$2,251,168

*Surplus.

Report of Celotex Co. for six months ended April 30, 1931, shows net loss of $165,814 after depreciation, interest, etc. This compares with net profit in corresponding six months of previous year of $227,955 equivalent after dividend requirements on 7% preferred stock, to 19 cents a share on 221,208 no-par shares of common stock.

Foreign

I. G. Farbenindustrie A. G. has declared a dividend of 12% for 1930, unchanged from 1929. Company reports gross profit for year ended December 31, 1930, of Rm. 217,480,000 against Rm.256,480,000 in previous year. After deducting interest, taxes and depreciation, net profit for 1930 was Rm.89,220,000 against Rm.104,598,000 in 1929. Dividend requirements for 1930 amounted to Rm.85,546,000 compared with Rm.95,922,000 in 1929. Balance carried forward to reserves was nil, as against Rm.5,000,000 in previous year.

Larger profits are looked forward to during current years as decline is only in nitrate business and other branches of the company are operating satisfactorily.

The Wintershall Corp., a principal factor in the German potash trust, has reported profit of 16,023,424 reichmarks for the year ended December 31, 1930. Gross profit from sales of potash and by-products, interest, and other operations aggregated 59,476,093 reichmarks. After expenses, taxes, depreciation and other deductions, and 8 per cent dividends totalling 16,000,000 reichmarks, there remained a balance of 23,424 reichmarks, which was carried to surplus. Surplus brought forward from 1929 totalled 109,022 reichmarks. The statement showed total assets of 391,294,246 reichmarks as of December 31, 1930, of which 20,088,982 reichmarks represented stocks of crude salts and finished products.

Liquid Carbonic Has Net Loss

Liquid Carbonic Co's net loss for six months March 31 was largely caused by decrease of nearly 30% in shipments and also by decrease in margin of profit on many of Liquid's products which it was impossible to offset by reductions in expenses amounting to $400,000, according to W. K. McIntosh, chairman. "It is probable that the six months just ended were the worst period of depression for us and that slow improvement has set in," he said. Increase in April shipments over March will probably be 28% as compared with an increase in the like period last year of 16%.

"We believe total reduction of nearly $1,000,000 in expenses will be effected for the fiscal year ending September 28, next. On April 1, salaries of all salaried employes and officers were reduced 8%, 10%, and 12%", he said.

Consolidated balance sheet of Liquid Carbonic Corp. and subsidiaries as of March 31, 1931, compares as follows:

	March 31, '31	*Sept. 30, '31*
Assets		
*Land, bldgs, mach., etc.	$11,093,686	$11,234,365
Cash	146,762	191,056
Notes receivable	5,888,668	6,012,865
Accounts receivable	1,447,013	2,297,547
Inventories	2,485,888	2,453,897
Investments	1,028,817	1,019,867
Deferred charges	63,701	108,234
Goodwill, Patents, etc.	1	1
Total	$22,154,536	$23,317,832
Liabilities		
Capital stock	†$17,121,299	$17,122,997
Notes payable	1,625,500	1,175,000
Accounts payable	826,411	1,082,561
Federal tax reserve	179,969	350,086
Customers' credit	.....	137,588
Dividends declared	256,804	342,406
Management per share	.....	125,000
Miscellaneous reserve	643,621	558,698
Deferred credits to inc	.....	9,182
Earned surplus	1,500,932	2,414,314
Total	$22,154,536	$23,317,832

†Represented by 342,406 no-par shares.

McKesson & Robbins, Inc., profits for the first three months of 1931 were slightly above those of the first quarter last year, despite the fact that dollar volume of sales was 11% less than last year, indicating that reduction in expenses has kept pace with the general decline in business, F. Donald Coster, president of the company, states.

Carman & Co. and subsidiaries report for quarter ended March 31, 1931, net profit of $46,143 after interest, federal taxes, etc., equivalent after dividend requirements on Class A stock, to 35 cents a share on 76,814 no-par shares of Class B stock. This compares with $68,564, or 66 cents a share on 72,500 Class B shares in first quarter of 1930.

Equipment

Link Belt Co. and subsidiaries report for quarter ended March 31, 1931, net profit of $242,631 after charges and taxes, equivalent after dividend requirements on 6½% preferred stock, to 25 cents a share on 709,177 shares of no-par common stock. This compares with $650,304, or 82 cents a share, on common in first quarter of 1930.

March net profit was $109,464 after above charges against $271,620 in March 1930.

American-La France & Foamite Corp. reports for quarter ended March 31, 1931, net loss of $132,561 after interest charges comparing with net loss of $66,322 in first quarter of 1930.

Oliver United Filters, Inc., reports for year ended December 31, 1930, net profit of $126,707, after depreciation, amortization, federal taxes, etc., equivalent, after dividend requirements on the $2 no-par Class A stock, to 4 cents a share on 170,000 no-par shares of Class B stock. This compares with $701,954 or $3.42 a share on Class B stock in 1929.

The Industry's Stocks

1931 May High	1931 May Low	1931 May Last	1931 High	1931 Low	1930 High	1930 Low	Sales In May	Sales During 1931	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1930	Earnings $-per share-$ 1929
									NEW YORK STOCK EXCHANGE					
88⅞	71⅛	74⅜	109⅜	71⅛	156⅛	87½	133,400	784,800	Air Reduction	No	830,000	$3.00	6.32	7.75
128¼	103¼	105	182¼	103¼	343	170½	250,900	1,247,585	Allied Chem. & Dye	No	2,401,000	6.00		12.60
124	122½	123½	126	120½	126½	120½	1,700	7,300	7% cum. pfd.	100	393,000	7.00		76.88
16	12⅛	13½	29½	12½	10⅜	1⅛	3,700	35,900	Amer. Agric. Chem.	100	333,000		Yr. Je. '30 Nil	
9⅛	6½	7⅛	14½	5⅞	33	9	15,200	123,200	Amer. Com. Alc.	No	389,000		—	3.22
16¼	9	10¼	23⅜	9	51½	7	11,100	58,700	Amer. Metal Co., Ltd.	No	1,218,000	1.00		3.23
78	53¼	...	89½	53½	116	80	200	800	conv. 6% cum. pfd.	100	68,000	6.00		47.53
40½	27½	27⅜	58½	27½	79¼	37½	90,000	489,495	Amer. Smelt. & Refin.	No	1,830,000	4.00		10.02
137½	117⅛	119	138½	117½	141	131	4,600	9,100	7% cum. pfd.	100	500,000	7.00		43.66
2⅛	1⅜	2¼	4⅛	1⅜	22½	2	2,500	7,000	Amer. Solvents & Chem.	No	503,000			2.56
5	3⅜	4	8⅜	3⅜	17⅞	3⅜	6,100	11,700	Amer. Zinc, Lead, & Smelt.	25	200,000			0.53
32	28⅜	30	39⅜	26⅛	79½	26½	2,700	8,800	6% cum. pfd.	25	80,000			7.32
29⅛	22⅜	22⅜	43⅛	22⅜	81½	25	378,500	2,336,025	Anaconda Copper Mining	50	8,859,000	2.50		8.29
11⅛	8	8⅛	18	8	29½	13⅜	9,600	65,100	Archer Dan. Midland	No	550,000	2.00	Yr. Aug. '30 1.68	
15⅛	12⅜	12⅜	23⅜	12½	51⅜	16⅜	49,400	475,400	Atlantic Refining Co.	25	2,690,000	1.00	1.02	6.20
39	33½	33½	54	33½	106	42	2,800	23,900	Atlas Powder Co.	No	265,000	4.00	2.67	7.66
95	87	90	99⅞	87	106	97	820	2,130	6% cum. pfd.	100	96,000	6.00		28.25
1	⅜	⅜	2	⅜	5¼	⅛	1,700	14,100	Butte & Sup. Mining	10	290,000			Nil
1⅛	1⅛	1⅛	2	1¼	4¼	1¼	2,400	22,300	Butte Copper & Zinc	5	600,000			0.34
4⅛	3⅛	3⅛	7¼	2¼	15⅞	2	4,600	52,700	Certain-Teed Products	No	400,000			Nil
...	...	...	25⅛	8¼	45½	6½		2,739	7% cum. pfd.	100	63,000			Nil
45	43½	43¾	50½	43½	64⅞	44	9,400	52,700	Colgate-Palmolive-Peet	No	2,000,000	2.50	3.76	4.03
76	60⅛	62	115⅛	60⅜	199	65½	54,200	332,520	Columbian Carbon	No	499,000	5.00		7.84
14½	11	11⅜	21½	11	38	14	93,300	1,225,100	Comm. Solvents	No	2,530,000	1.00	1.07	1.51
69½	56½	57½	86⅜	56½	111⅜	65	96,500	360,400	Corn Products	25	2,530,000	3.00		5.49
152½	149	149½	152½	146⅛	151½	140	1,230	3,370	7% cum. pfd.	100	250,000	7.00		62.59
14	10½	10½	23	10½	43⅜	10	13,000	201,300	Davison Chem. Co.	No	504,000		Yr. Je. '30 4.00	
13¾	12½	12½	19½	12¼	42½	11½	1,100	12,400	Devoe & Raynolds "A"	No	160,000	1.20	2.24	4.52
103	100⅛	100⅛	109	100⅛	114¼	99	140	320	7% cum. 1st pfd.	100	16,000	7.00		67.59
88	73½	74¾	107	73¼	145½	80½	562,100	1,857,100	DuPont de Nemours	20	11,014,000	4.00	4.64	6.99
122¼	120½	121⅛	124	118½	123	114½	3,700	15,200	6% cum. deb.	100	978,000	6.00		78.54
163	126½	129¼	185⅜	126½	255½	142½	180,600	717,605	Eastman Kodak	No	2,261,000	5.00		9.57
134	132	132	134½	126½	134	120½	220	1,070	6% cum. pfd.	100	62,000	6.00		356.89
30½	24½	25½	43½	24½	55½	24½	57,100	586,000	Freeport Texas Co.	No	730,000	4.00		5.60
23⅞	18⅛	19	47	18⅛	71½	22⅜	53,400	366,100	General Asphalt Co.	No	413,000	3.00		4.71
10½	8½	9	16½	8½	38	7	9,600	140,371	Glidden Co.	No	695,000		Yr. Oct. '30 Nil	
68¼	60	65	78	60	105½	63½	1,640	3,890	7% cum. prior pref.	100	74,000	7.00	Yr. Oct. '30 Nil	
45½	40	44	58	40	85	50	1,300	6,900	Hercules Powder Co.	No	603,000	3.00	2.91	5.95
118⅛	116	116	119½	116	123¾	116½	450	1,660	7% cum. pfd.	100	114,000	7.00		38.16
34½	26	28½	86	26	124	31	27,600	243,100	Industrial Rayon	No	200,000	4.00		7.26
2⅛	1⅛	1⅛	5½	1⅛	8½	3⅛	3,800	28,800	Intern. Agric.	No	450,000		Yr. Je. '30 1.68	
33	17	17	51½	17	67½	42½	3,300	8,800	7% cum. prior pfd.	100	100,000	7.00	Yr. Je. '30 14.58	
15½	10	10½	20⅛	10	44⅜	12½	486,400	3,127,500	Intern. Nickel	No	14,584,000	1.00		1.47
33	30⅛	30⅜	42	29⅜	45½	31	9,000	315,900	Intern. Salt	No	240,000	3.00		11.32
51⅜	40⅛	45½	80½	40⅛	148⅜	48⅜	425,100	1,553,500	Johns-Manville Corp.	No	750,000	3.00		8.09
13¼	12	12	16½	10	25	8¾	300	9,500	Kellogg (Spencer)	No	598,000	0.80		2.36
31	24½	25½	55⅛	24⅛	81¼	39	22,600	142,800	Liquid Carbonic Corp.	No	342,000	4.00	Yr. Sep. '30 5.22	
14	10	10¼	17	10	37⅞	10½	28,800	124,300	McKesson & Robbins	No	1,073,000	1.00		2.65
32½	30	31½	37¼	29½	49½	25½	3,000	20,600	conv. 7% cum. pref.	50	428,180	3.50		9.43
17⅛	17	17	25	17	39½	20	800	7,600	MacAndrews & Forbes	No	340,000	2.60		3.13
21⅛	18⅛	18⅛	31½	18⅛	51⅜	30½	15,600	328,265	Mathieson Alkali	No	650,000	2.00	2.96	3.31
114	112	114	125⅜	112	136	115	170	520	7% cum. pfd.	100	28,000	7.00		93.91
22	19½	19½	26½	18½	63¾	18⅜	4,000	30,000	Monsanto Chem.	No	416,000	1.25	1.80	4.25
28½	23⅜	23⅜	36⅜	19⅜	39½	18½	18,100	244,000	National Dist. Prod.	No	252,000	2.00		1.42
113	88⅜	90	132	88½	189½	114	18,200	37,200	National Lead	100	310,000	5.00		25.49
141½	140	140	141½	135⅜	144	135	1,130	3,350	7% cum. "A" pfd.	100	244,000	7.00		41.95
118	118	118	119⅞	118	120	116	900	3,200	6% cum. "B" pfd.	100	103,000	6.00		82.47
48	45	45	53	42	85	30	400	4,000	Newport $3 cum. conv. "A"	50	33,000	3.00		29.79
36½	29½	29½	46½	29½	55⅜	26½	18,200	194,100	Penick & Ford	No	425,000	1.00		3.97
68½	59⅛	60⅜	71½	59½	78⅞	52⅛	30,200	136,700	Procter & Gamble	No	6,410,000	2.40	Yr. Je. '30 3.36	
6½	5¼	5¼	11⅛	5½	27½	7⅛	45,700	252,800	Pure Oil Co.	25	3,038,000			1.52
84	67	68	101¼	67	114½	90½	2,250	6,520	8% cum. pfd.	100	130,000	8.00		22.55
32	27½	27½	42⅜	27½	56½	36⅞	87,500	194,000	Royal Dutch, N. Y. shs.		894,000			3.35
17½	15	15½	30⅜	15	57½	19½	12,800	219,900	St. Joseph Lead	10	1,951,000	2.00	2.09	3.82
5½	4½	5	10½	4½	25½	5½	75,500	478,340	Shell Union Oil	No	13,071,000			1.26
39	33⅜	34	51¼	33	75	42½	83,700	514,800	Standard Oil, Calif.	No	12,846,000	2.50		3.63
38⅜	33	33	52½	33	84¼	43½	267,700	1,978,300	Standard Oil, N. J.	25	25,419,000	1.00		4.76
19½	15½	15⅜	26	15½	40⅜	19½	140,400	828,955	Standard Oil, N. Y.	25	17,809,000	1.60		2.23
6⅞	5½	5½	9½	5½	17	7½	7,500	38,600	Tenn. Corporation	No	857,000	1.00		2.19
23½	18⅜	19½	36¼	18⅜	60½	28½	272,500	1,140,700	Texas Corp.	25	9,851,000	3.00		4.91
43⅜	34½	35½	55⅜	34½	67⅜	40½	205,400	882,000	Texas Gulf Sulphur	No	2,540,000	4.00	5.50	6.40
54⅜	44½	46	72	44½	106⅜	52½	684,800	2,090,200	Union Carbide & Carb.	No	9,001,000	2.60		3.94
18	13⅛	14¼	28⅜	13⅛	84	14⅜	33,700	383,000	United Carbon Co.	No	398,000		1.43	1.94
34	25	28⅜	77⅜	25	139½	50½	18,500	606,950	U. S. Ind. Alc. Co.	No	374,000	6.00	—	12.63
46½	25½	26⅜	76¼	25½	143½	44⅜	476,100	6,024,900	Vanadium Corp. of Amer.	No	378,000	3.00		4.91
1⅛	1⅛	1⅛	3⅛	1⅛	8⅛	1⅛	2,100	19,100	Virginia Caro. Chem.	No	487,000		Yr. Je. '30 Nil	
10½	8½	8½	17	8½	34½	9	2,700	12,300	6% cum. part. pfd.	100	213,000		Yr. Je. '30 2.63	
64	60	60	72	60	82½	67½	1,700	4,200	7% cum. prior pfd.	100	145,000	7.00	Yr. Je. '30 11.96	
27	22	22	40	22	59½	18	1,700	48,650	Westvaco Chlorine Prod.	No		2.00	2.51	4.32
									NEW YORK CURB					
5⅛	4⅛	4⅛	5⅜	4⅛	13	3⅛	300	2,300	Acetol Prod. conv. "A"	No	60,000			0.42
14	9	9	19½	5	34	16	2,700	84,925	Agfa Ansco Corp.	No	300,000			Nil
158	95	95	224	95	356	140½	19,975	84,800	Aluminum Amer.	No	1,473,000			11.18
108½	89	100½	109½	89	111½	104	3,750	14,850	6% cum. pfd.	100	1,473,000	6.00		17.19
75	40½	40½	102	40½	232	57½	1,200	10,200	Aluminum Ltd.	No	573,000			4.15
8½	7	7	12⅛	6½	37	6½	70,700	366,300	Amer. Cyanamid "B"	No	2,404,000			4.15
10	6½	6½	15	6½	43⅜	7½	7,200	42,600	Anglo-Chilean Nitrate	No	1,757,000		Yr. Je. '30 Nil	
3	2½	2½	4	⅜	6½	½	400	19,100	Assoc. Rayon Corp.	No	1,200,000		Yr. Je. '30 1.87	
58½	57¼	...	60	32½	60⅜	31½	500	47,300	conv. 6% cum. pfd.	100	200,000	6.00		

1931 May High	1931 May Low	1931 May Last	1931 High	1931 Low	1930 High	1930 Low	Sales In May	Sales During 1931	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1930	Earnings $-per share-$ 1929
1¼	⅞	⅞	1⅞	⅞	5¼	1⅜	200	19,800	Brit. Celanese Am. Rcts	2.43	2,806,000			0.03
54	45½	...	59	45½	90	48	875	2,000	7% cum. part. 1st pfd	100	148,000	7.00		14.50
75	71	72	80	68¼	90	70	200	1,255	7% cum. prior pfd	100	115,000	7.00		25.70
7	7	7	...	...	20	3½	100	6,440	Celluloid Corp	No	195,000			1.76
...	...	...	...	...	103	90½	...	...	7% cum. 1st part. pfd.	No	24,000	7.00		8.59
8	7½	...	9	7¼	13¼	8⅜	300	3,700	Courtaulds, Ltd	1£				0.34
46	35	35½	51	35	100	49	5,300	7,700	Dow Chemical	No	630,000	2.00		4.08
54	42¼	42½	75½	42¼	166⅞	58½	13,800	124,400	Gulf Oil	25	4,525,000	1.50		9.83
10	10	10	13	10	23	10½	200	2,100	Heyden Chemical Corp	10	150,000			3.08
2¾	2¾	2¾	...	...	7	4	600	1,600	Imperial Chem. Ind	1£				0.49
...	...	...	...	...	16	3½		100	Monroe Chem	No	126,000			2.54
43½	39	...	60	39	79½	45	700	3,000	Shawinigan W. & P	No	2,178,000	2.50		2.35
60¼	60¾	60¾	66¼	60	85	58	5,000	5,950	Sherwin-Williams Co	25	636,000	4.00	Yr. Aug. '30 4.14	
6⅜	3½	4	12	3⅞	34½	3½	4,800	22,800	Silica Gel Corp	No	600,000			
28	21¾	22	38½	21¾	59⅛	30	143,400	694,900	Standard Oil Ind	25	16,851,000	2.50		4.66
27¾	26	26	30⅜	26	34½	27	8,500	34,700	Swift & Co	25	6,000,000	2.00		2.18
7⅜	4½	4½	16	3⅜	22¾	3	9,700	132,450	Tubize "B"	No	600,000	10.00		
10½	10½	10½	13	10			100	16,500	United Chemicals					
21⅛	17½	17½	28⅞	14	44	14	1,600	18,700	$3 cum. part. pfd.	No	115,000	3.00		7.66
									CLEVELAND					
81	78	80½	94	78	96	91½	249	1,310	Cleve-Cliffs Iron, $5 pfd	No	498,000	5.00	11.42	
62	58	58	68½	55½	85	57½	1,014	10,690	Sherwin-Williams Co	25	636,000	4.00	Yr. Aug. '30 4.14	
									CHICAGO					
39	36⅜	36⅜	39⅞	35	46¾	33½	650	5,050	Abbott Labs	No	145,000	2.50	3.32	4.92
5	5	5	5½	4¾	15	3½	70	2,560	Monroe Chem	No	126,000			2.54
33	28	28	33	21	35	15½	620	1,480	$3.50 cum. pref	No	30,000	3.50		13.35
					33½	27			Swift & Co	25	6,000,000	2.00		2.18
									CINCINNATI					
68⅛	60	60	71	60	110	53⅛	6,234	13,359	Procter & Gamble	No	6,410,000	2.40	Yr. Je. '30 3.36	
									PHILADELPHIA					
58	58	58	81¼	58	100	89	200	1,800	Pennsylvania Salt	50	150,000	5.00	Yr. Je. '30 7.97	

The Industry's Bonds

1931 May High	1931 May Low	1931 May Last	1931 High	1931 Low	1930 High	1930 Low	Sales In May	Sales During 1931	ISSUE	Date Due	Int. %	Int. Period	Out-standing $
									NEW YORK STOCK EXCHANGE				
104¼	103¼	103½	105⅛	102¾	105½	102	76	351	Amer. Agric. Chem., 1st ref. s. f. 7½s	1941	7½	F. A.	7,667,000
93½	89	88	99	89	100½	93	14	158	Amer. Cyan. deb. 5s	1942	5	A. O.	4,554,000
102	99	99⅛	102	96⅞	177	94⅛	701	1,442	Amer. I. G. Chem. conv. 5½s	1949	5½	M. N.	29,933,000
104	102⅜	102⅛	104⅛	102	104	101	287	2,353	Am. Smelt & Ref. 1st. 5s. "A"	1947	5	A. O.	36,578,000
77	63	65	87	63	98½	67	119	454	Anglo-Chilean s. f. deb. 7s	1945	7	M. N.	14,600,000
102½	100½	101⅛	103	100½	103	100	254	829	Atlantic Refin. deb. 5s	1937	5	J. J.	14,000,000
102¼	100½	100	104	100½	105½	100½	86	507	Interlake Iron Corp. 1st 5½s "A"	1945	5½	M. N.	6,629,000
105	103⅛	13½	105	102	104½	97½	30	67	Corn Prod. Refin. 1st s. f. 5s	1934	5	M. N.	1,822,000
56⅞	40¼	40¼	75½	40	87½	38	437	3,098	Lautaro Nitrate conv. 6s	1954	6	J. J.	32,000,000
84⅛	77	79	96	77	100½	87	379	829	Pure Oil s. f. 5½% notes	1937	5½	F. A.	17,500,000
96½	94	95½	103	88	104	93¾	68	475	Solvay Am. Invest. 5% notes	1942	5	M. S.	15,000,000
103⅜	102½	103¼	105½	102	104⅜	100	1,085	3,147	Standard Oil, N. J. deb. 5s	1946	5	F. A.	120,000,000
99½	96½	99⅛	106½	98½	104⅛	96½	659	2,788	Standard Oil, N. Y. deb. 4½s	1951	4½	J. D.	50,000,000
91½	89½	89½	99	89½	102½	90½	41	162	Tenn. Corporation deb. 6s. "B"	1944	6	M. S.	3,308,000
									NEW YORK CURB				
105½	104½	...	105½	102¾	104⅞	100⅛	178,000	1,019,000	Aluminum Co., s. f. deb. 5s	1952	5	M. S.	37,115,000
104½	95	95	104½	95	104¼	96⅜	176,000	661,000	Aluminum Ltd., 5s	1948	5	J. J.	20,000,000
47⅞	47⅞	...	56	47⅞	60	51	1,000	24,000	Amer. Solv. & Chem. 6½s	1936	6½	M. S.	1,737,000
...	...	...	38	26	...	...		45,000	General Ind. Alc., 6½s	1944	6½	M. N.	2,351,000
51	44½	46	53	44½	80	51	93,000	285,000	General Rayon 6s. "A"	1948	6	J. D.	5,085,000
103	100	100½	103	100	104	90¼	477,600	5,436,000	Gulf Oil, 5s	1937	5	J. D.	30,414,000
101¾	100	100½	104	100	104	99	642,000	1,148,000	Sinking Fund deb. 5s	1947	5	F. A.	35,000,000
102	100⅛	100⅛	102⅞	99¼	103½	95½	231,000	971,000	Koppers G. & C. deb, 5s	1947	5	J. D.	23,050,000
98⅜	95	97⅛	98⅜	92⅜	98⅜	90⅜	361,000	1,775,000	Shawinigan W. & P. 4½s. "A"	1967	4½	A. O.	35,000,000
98½	96	98½	98½	96	98¾	90¾	94,000	541,000	4½s., series "B"	1968	4½	M. N.	16,108,000
86½	86½	...	94	86½	107	96	5,000	60,000	Silica Gel Corp. 6½s	1932	6½	A. O.	1,700,000
104	103	104	104	102	103½	79½	45,000	401,000	Swift & Co., 5s	1944	5	J. J.	22,916,000
104⅛	102¾	104⅛	104⅛	101	103½	100½	23,000	139,000	Westvaco Chlorine Prod. 5½s	1937	5½	M. S.	1,992,000

The Trend of Prices

IMPORTANT PRICE CHANGES

Advances	May	April
Paradichlorobenzine	$ 0.15½	$ 0.15
Paratoluidine	.43	.40
Sodium Acetate	.05	.04½
Declines		
Copper Sulfate	3.90	4.25
Glycerine C. P.	.12	.12½
Lead Acetate, white broken	11.00	11.50
Methanol, pure, tanks	.37½	.40½
Paraminophenol	.82	.84
Saltpeter	.07	.07½
Carnauba, No. 1	.37	.40
Japan Wax	.10	.10½
Montan Wax	.05½	.07

The chemical markets again witnessed a greater number of declines than increases during the month and consequently the Average Price of twenty representative industrial chemicals reached a new low for the current trade recession (See page 644). Perhaps the most important reduction occurring during the month was the revision of copper sulfate prices from $4.25 to $3.90 in the face of substantial seasonal bookings and a very satisfactory volume demand from the agricultural sections. However, with the metal down to as low as 8½ to 8¾c, a new low record for all time, it was necessary to bring the salt more in line with the metal price. Producers of methanol, synthetic pure, announced a reduction to meet the lower prices of the natural product announced the previous month, the new schedule now being based on 37½c in tanks and 2c higher for drums.

Several of the coal tar chemicals were lowered during month, cresol (U.S.P.) from 13c to 12½c; toluidine base was reduced 1c to 88c; paraaminophenol base 2c to 82c; on the other hand paradichlorobenzine was increased ½c to 15½c and paratoluidine was advanced to 43c.

Some other reductions in the industrial chemical prices were recorded in the various grades of lead acetate and in glycerine, C. P. grade. The fertilizer prices were unsteady during the month in the face of a poor demand from most sections of the country and a number of items were lower.

The naval stores industry felt a slight betterment in inquiry although sales were still rather limited. Prices were steadier during the last two weeks of the month than they have been in some time. The waxes were unable to hold all of the gains made during April and prices were off with the arrival of further shipments from abroad and the easing of the tension. The gum market continued to drag bottom and here and there in the list new lows were recorded in the face of continued indifference from buyers. The shellac market was fairly active in spots and demand from some consuming channels rather heavy.

General Business

The business horizon continues to be clouded with a number of undeniably unfavorable spots in the commercial structure. The picture is still very much confused with conflicting opinions and contradictory indices. Retail trade was aided near the close of the month by hot weather which should have forced the purchasing by consumers specially with prices as attractive as they are now. On the other hand, the wholesale and jobbing trades are still marking time awaiting some signs of revival.

The sorest spot continues to be the weakness in raw commodity prices. Each week for several months has witnessed fresh declines that have had a very disconcerting effect on buying and has prolonged the tendency on the part of buyers to hold strictly to purchasing in very small quantities and only for immediate requirements. The bright side of this picture is that while declines have outnumbered advances that there has been a noticeable tightening in many items notably building materials and in grain markets. Even in those where new lows were made the pressure is reported to be less.

Steel mill operation was again off in May from April, which in turn showed a decline from March, reflecting a somewhat lessened demand from automobile producers. Building activity did not decline to any appreciable extent but is still below the rate for the same period a year ago. Textile mills were still a favorable factor and both the leather and shoe industries have increased operations. Such rather seasonal industries as paint and varnish were said to be feeling the stimulus of increased demand.

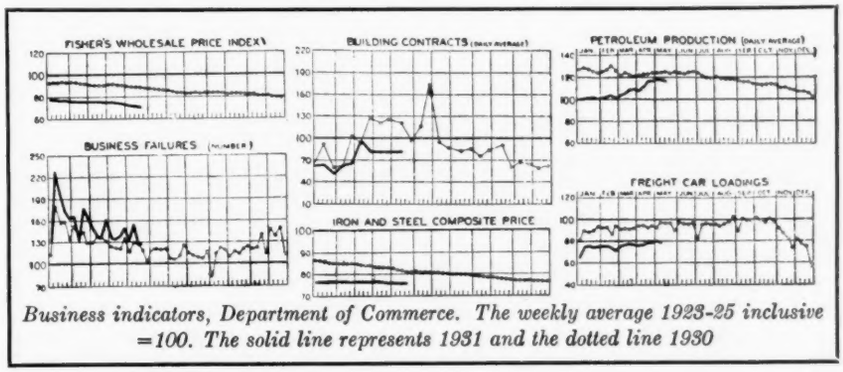
The weekly index of business activity of the N. Y. Times has declined sharply to a new low level for the current depression. The preliminary figure for the week ended May 23 was 76.0, as compared with 77.2 for the week ended May 16 and 93.5 for the week ended May 24, 1930.

Three components of the index declined and two advanced, but the three that declined were the three which have the heaviest weight in the composite.

Indices of Business

	Latest Available Month	Previous Month	Year Ago
Automobile Production, April	335,708	276,405	444,024
†Brokers Loans, May 29	$1,574	$1,631	$4,022
*Building Contracts, April	$336,925	$370,406	$483,251
*Car Loadings, May 29	747	747	928
†Commercial Paper, March 31	$311	$315	$529
Factory Payrolls, April	73.6	74.9	97.1
*Mail Order Sales, March	$43,008	$39,422	$47,582
Number of Failures Dun, April	$50,868	$60,386	$49,059
*Merchandise Imports, April	$187,000	$211,000	$307,927
*Merchandise Exports, April	$217,000	$237,000	$331,843
Furnaces in Blast %, May 9	36.0	36.9	57.5
*Steel Unfinished Orders, April 30	3,897	3,995	4,354

†000 omitted.
†000,000 omitted.



Business indicators, Department of Commerce. The weekly average 1923-25 inclusive =100. The solid line represents 1931 and the dotted line 1930

Prices Current

Heavy Chemicals, Coaltar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Naval Stores, Fatty Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Imported chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

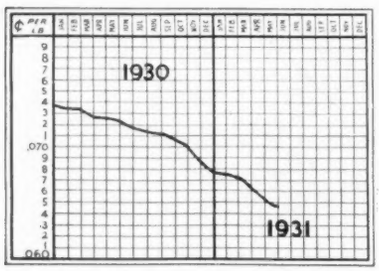
Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - May 1931 $1.369

Average Price Again Declines to New Low



CHEMICAL MARKETS Average Price for twenty representative industrial chemicals declined to a new low during May due to lower prices for copper sulfate and synthetic methanol, the fifteenth consecutive month of decline. On May 31 the Average Price stood at .0647c as against .0651c for April and .0724c for May 1930.

Acetone — For the first time in several months producers reported some improvement in actual shipments. The price structure remained unaltered.

Acid Acetic — The sustained improvement in the textile industry has proved to be a very steady influence on prices and shipments into this industry were comparable with the same period a year ago or even better in some instances.

Acid Chromic — A better tone was in evidence during the past month and prices were steadier with shipments into the automobile industry showing continued improvement.

Acid Citric — The advent of the hot weather brought forth a larger demand from consuming channels.

Acid Formic — Movement into the textile industry showed a decided improvement during the past month. Prices remained unaltered.

Acid Sulfuric — Demand continued light with the fertilizer companies curtailing very considerably purchases because of the lessened demand from the agricultural sections and the end of the main shipping period. Prices were unaltered. March production of sulfuric

	Current Market	1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Acetaldehyde, drs 1c-1 wks...lb.	.18½	.21 .18½	.21	.21	.18½	.21	.18½
Acetaldol, 50 gal dr.....lb.	.27	.31 .27	.31	.31	.27	.31	.27
Acetamide.....lb.	.95	1.35 .95	1.35	1.35	1.20		
Acetanilid, tech, 150 lb bbl...lb.	.20	.23 .20	.23	.23	.21	.24	.21
Acetic Anhydride, 92-95%, 100 lb cbys.....lb.	.21	.25 .21	.25	.29	.25	.35	.28
Acetin, tech drums.....lb.	.30	.32 .30	.32	.32	.30	.32	.30
Acetone, tanks,.....lb.	.10	.10½ .10	.10½	.12	.11	.16	.11
Acetone Oil, bbls NY.....gal.	1.15	1.25 1.15	1.25	1.25	1.15	1.25	1.15
Acetyl Chloride, 100 lb cby...lb.	.55	.68 .55	.68	.68	.55	.68	.45
Acetylene Tetrachloride (see tetrachlorethane).....							
Acids							
Acid Abietic.....	.12	.12 .12	.12	.....	.....	.....	.....
Acetic, 28% 400 lb bbls c-1 wks.....100 lb.	.....	2.60	2.60	3.88	2.60	3.88	3.88
Glacial, bbl c-1 wk.....100 lb.	.....	9.23	9.23	13.68	9.23	13.68	13.68
Glacial, tanks.....	.....	8.98	8.98	13.43	8.98		
Adipic.....	.72	.72 .72	.72	.....	.....	.....	.....
Anthranilic, refd, bbls.....lb.	.85	.95 .85	.95	1.00	.85	1.00	.98
Technical, bbls.....lb.	.65	.70 .65	.80	.80	.75	.80	.80
Battery, cbys.....100 lb.	1.60	2.25 1.60	2.25	2.25	1.60	2.25	1.60
Benzoic, tech, 100 lb bbls....lb.	.40	.45 .40	.45	.53	.40	.60	.51
Boric, crys. powd, 250 lb. bbls.....lb.	.06½	.07 .06½	.07¾	.07¾	.06½	.07¾	.05¾
Broenner's, bbls.....lb.	1.20	1.25 1.20	1.25	1.25	1.20	1.25	1.25
Butyric, 100% basis cbys.....lb.	.80	.85 .80	.85	.90	.80	.90	.85
Camphoric.....lb.	.....	5.25	5.25	5.25	5.25	5.25	4.85
Chlorosulfonic, 1500 lb drums wks.....lb.	.04½	.05½ .04½	.05½	.05½	.04½	.05½	.04½
Chromic, 99½%, drs.....lb.	.14½	.16 .14½	.17	.19	.15	.23	.17½
Chromotropic, 300 lb bbls....lb.	1.00	1.06 1.00	1.06	1.06	1.00	1.06	1.00
Citric, USP, crystals, 230 lb. bbls.....lb.	.37	.37½ .37	.43	.59	.40	.70	.46
Cleve's, 250 lb bbls.....lb.	.52	.54 .52	.54	.54	.52	.59	.52
Cresylic, 95%, dark drs NY..gal.	.47	.60 .47	.60	.70	.54	.54	.60
97-99%, pale drs NY.....gal.	.50	.60 .50	.60	.77	.58	.77	.72
Formic, tech 90%, 140 lb. cby.....lb.	.10½	.12 .10½	.12	.12	.10½	.12	.10½
Gallic, tech, bbls.....lb.	.60	.70 .60	.70	.55	.50	.12	.50
USP, bbls.....lb.	.....	.74	.74	.74	.74	.55	.74
Gamma, 225 lb bbls wks.....lb.	.77	.80 .77	.80	.80	.77	.80	.74
H, 225 lb bbls wks.....lb.	.65	.70 .65	.70	.70	.65	.99	.80
Hydriodic, USP, 10% soln cby lb.	.....	.67	.67	.67	.67	.72	.67
Hydrobromic, 48%, coml, 155 lb cbys wks.....lb.	.45	.48 .45	.48	.48	.45	.67 .48	.45
Hydrochloric, CP, see Acid Muriatic.....							
Hydrocyanic, cylinders wks...lb.	.80	.90 .80	.90	.90	.80	.90	.80
Hydrofluoric, 30%, 400 lb bbls wks.....lb.	.....	.06	.06	.06½	.06	.06	.06
Hydrofluosilicic, 35%, 400 lb bbls wks.....lb.	...11	.12 .11	.12	.12	.11	.11	.11
Hypophosphorous, 30%, USP, demijohns.....lb.	.....	.85	.85	.85	.85	.85	.85
Lactic, 22%, dark, 500 lb bbls lb.	.04	.04½ .04	.04½	.05	.04	.05½	.04½
44%, light, 500 lb bbls.....lb.	.11½	.12 .11½	.12	.12	.11	.12½	.11
Laurent's, 250 lb bbls.....lb.	.36	.42 .36	.42	.42	.36	.42	.40
Linoleic.....	.16	.16 .16	.16	.....	.....	.....	.....
Malic, powd., kegs.....lb.	.45	.60 .45	.60	.60	.45	.60	.48
Metanilic, 250 lb bbls.....lb.	.60	.65 .60	.65	.65	.60	.65	.60
Mixed Sulfuric-Nitric.....							
tanks wks.....N unit	.07	.07½ .07	.07½	.07½	.07	.07½	.07
tanks wks.....S unit	.008	.01 .008	.01	.01	.008	.01	.008
Monochloroacetic, tech bbl..lb.	.20	.30 .20	.30	.30	.18	.21	.18
Monosulfonic, bbls.....lb.	1.65	1.70 1.65	1.70	1.70	1.65	1.70	1.65
Muriatic, 18 deg, 120 lb cbys c-1 wks.....100 lb.	.....	1.35	1.35	1.35	1.35	1.40	1.35
tanks, wks. 100 lb.		1.00	1.00	1.00	1.00	1.00	1.00
20 degrees, cbys wks...100 lb.	.....	1.45	1.45	....	1.45	....	1.45
N & W, 250 lb bbls.....	.85	.95 .85	.95	.95	.85	.95	.85
Naphthionic, tech, 250 lb.....	.....	Nom.....	Nom.	Nom.	.....	.59	.55
Nitric, 36 deg, 135 lb cbys c-wks.....100 lb.	.....	5.00	5.00	5.00	5.00	5.00	5.00
40 deg, 135 lb cbys, c-1 wks.....100 lb.	.....	6.00	6.00	6.00	6.00	6.00	6.00
Oxalic, 300 lb bbls wks NY...lb.	.11	.11½ .10½	.11½	.11¾	.11	.11¾	.11
Phosphoric 50%, U. S. P.....lb.	.....	.14	.14	.14	.14	.14	.08
Syrupy, USP, 70 lb drs....lb.	.....	.14	.14	]	.14	.16	.14
Commercial, tanks,.....Unit.	.....	.80	.80	.80	.80	.....	.....
Picramic, 300 lb bbls.....lb.	.65	.70 .65	.70	.70	.65	.70	.65
Picric, kegs.....lb.	.30	.50 .30	.50	.50	.30	.50	.30
Pyrogallic, crystals.....							
.....lb.	1.50	1.60 1.50	1.60	1.60	1.30	1.40	.86
Salicylic, tech, 125 lb bbl.....lb.	.33	.37 .33	.37	.37	.33	.42	.33
Sulfanilic, 250 lb bbls.....lb.	.15	.16 .15	.16	.16	.15	.16	.15
Sulfuric, 66 deg, 180 lb cbys 1c-1 wks.....100 lb.	1.60	1.95 1.60	1.95	1.95	1.60	1.95	1.60
tanks, wks. ton		15.00	15.00	15.50	15.00	15.50	15.50
1500 lb dr wks.....100 lb.	1.50	1.65 1.50	1.65	1.65	1.50	1.65	1.50
60°, 1500 lb dr wks....100 lb.	1.27½	1.42½ 1.27½	1.42½	1.42½	1.27½	1.42½	1.27½

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - May 1931 $1.369

acid, based on preliminary reports from 74 fertilizer manufacturers to the Bureau of the Census, totaled 142,071 short tons, which compares with 155,953 tons in February and 188,968 tons during March last year. Production for the first three months of the year, 462,423 tons, against 579,598 tons during the same three months last year, and 583,551 tons during the first quarter of 1929. Amount purchased from nonfertilizer producers in March was 24,356 tons; in February, 34,994 tons, and in March last year, 28,942 tons. Such purchases for the first quarter were 116,724 tons, against 109,573 tons last year and 112,063 tons two years ago. The fertilizer manufacturers reported stocks on hand of 110,958 tons at the end of March against 115,580 tons at the end of February, 107,294 tons in January, and 95,296 tons at the end of March last year. Consumed in making fertilizer, including shipments to other fertilizer producers, 138,039 tons in March, 148,194 tons in February, and 201,744 tons in March last year. For the first three months, 474,462 tons against 668,018 tons last year and 631,572 tons two years ago.

Alcohol — The market continued to move in a very dull and listless way with actual sales so small that the market at 24c was hardly tested.

Ammonia Anhydrous — The recent heat wave in the Eastern section of the country served to stimulate demand.

Antimony — The metal was weaker during the past month. In the absence of normal demand producers and importers were unable to stabilize prices.

Arsenic — The restriction of output of copper has served to strengthen somewhat the position of arsenic. Shipments were reported as being heavier in May than in April.

Benzol — Slackening in coke operations tended to lower existing stocks and prices were reported to be firmer. Shipments were still being held to a minimum by consumers. Output of benzols in April amounted to 13,089,150 gallons, contrasted with 13,543,870 gallons in March and 17,906,150 gallons in the corresponding period a year ago.

Borax — The even tenor of the market for this commodity continues with shipments reported as being satisfactory and prices holding to published quotations. Considerable interest was caused in the trade by the announcement that William S. Gray & Co. had been appointed sole selling agents for the Western Borax Co.

	Current Market	1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Oleum, 20%, 1500 lb. drs 1c-1 wks ton	.....	18.50	.....	18.50	18.50	18.50	18.50	18.50
40%, 1c-1 wks net ton	.....	42.00	.....	42.00	42.00	42.00	42.00	42.00
Tannic, tech, 300 lb bbls lb.	.23	.40	.23	.40	.40	.23	.40	.30
Tartaric, USP, gran. powd, 300 lb. bbls lb	.....	.31½	.....	.31½	.38½	.33	.38½	.38
Tobias, 250 lb bbls. lb.	.....	.85	.....	.85	.85	.85	.85	.85
Trichloroacetic bottles lb.	.....	2.75	.....	2.75	2.75	2.75	2.75	2.75
Kegs lb.	.....	2.00	.....	2.00	2.00	2.00	2.00	2.00
Tungstic, bbls lb.	1.40	1.70	1.40	1.70	1.70	1.40	2.25	1.00
Albumen, blood, 225 lb bbls lb.	.38	.40	.38	.40	.40	.38	47	.38
dark, bbls., lb.	.12	.20	.12	.20	.20	.12	.20	.12
Egg, edible lb.	.55	.56	.55	.56	.75	.55	.83	.70
Technical, 200 lb cases lb.	.50	.55	.50	.55	.73	.50	.80	.70
Vegetable, edible lb.	.60	.65	.60	.65	.65	.60	.65	.60
Technical lb.	.50	.55	.50	.55	.55	.50	.55	.50
Alcohol								
Alcohol Butyl, Normal, 50 gal drs c-1 wks lb.	.16¼	.17¼	.16¼	.17¼	.18¼	.17¼	.17¼	.17¼
Drums, 1-c-1 wks lb.	.16¾	.17¾	.16¾	.17¾	.18¾	.17¾	.18¼	.17¾
Tank cars wks lb.	.15¾	.16¾	.15¾	.16¾	.17¾	.16¾	.17¼	.16¾
Amyl (from pentane) Tanks wks lb.	.....	.236	.....	.236	.236	.236	1.67	1.67
Diacetone, 50 gal drs del gal.	1.42	1.60	1.42	1.60	1.60	1.42	1.80	1.42
Ethyl, USP, 190 pf, 50 gal bbls gal.	.....	2.37	2.37	2.75	2.75	2.63	2.75	2.69½
Anhydrous, drums gal.	.54	.58	.54	.60	.71	.56	.71	.71
No. 5, 188 pf, 50 gal drs. drums extra gal.	.27	.29	.27	.44	50	.40	.51	.48
Tank, cars gal.	.....	.24	.24	.38	.48	.37	.50	.46
Isopropyl, ref, gal drs gal.	.90	1.00	.90	1.00	1.00	.60	1.30	1.00
Propyl Normal, 50 gal dr. gal.	.....	1.00	.....	1.00	1.00	1.00	1.00	1.00
Alcotate, tanks gal.	.....	.60	.60	.60	.....	.....	.....	.....
Aldehyde Ammonia, 100 gal dr lb.	.80	.82	.80	.82	.82	.80	.82	.80
Alpha-Naphthol, crude, 300 lb bbls lb.	.60	.65	.60	.65	.65	.60	.65	.65
Alpha-Naphthylamine, 350 lb bbls lb.	.32	.34	.32	.34	.34	.32	.34	.32
Alum Ammonia, lump, 400 lb bbls, 1c-1 wks 100 lb.	3.20	3.50	3.20	3.50	3.50	3.20	3.50	3.25
Chrome, 500 lb casks, wks 100 lb.	4.50	5.25	4.50	5.25	5.25	4.50	5.50	5.00
Potash, lump, 400 lb casks wks 100 lb.	3.25	3.50	3.10	3.50	3.50	3.10	3.50	3.00
Soda, ground, 400 lb bbls wks 100 lb.	3.50	3.75	3.50	3.75	3.75	3.50	3.75	3.75
Aluminum Metal, c-1 NY 100 lb.	22.90	24.30	22.90	24.30	24.30	24.30	24.30	24.30
Chloride Anhydrous, lb.	.05	.09	.05	.09	.15	.05	.20	.05
Hydrate, 96%, light, 90 lb bbls lb.	.16	.17	.16	.17	.18	.16	.18	.17
Stearate, 100 lb bbls lb.	.18	.21	.18	.22	.26	.19	.26	25
Sulfate, Iron, free, bags c-1 wks 100 lb.	1.90	1.95	1.90	1.95	2.05	1.90	2.05	1.95
Coml, bags c-1 wks 100 lb.	1.25	1.30	1.25	1.30	1.40	1.25	1.40	1.40
Aminoazobenzene, 110 lb kegs lb.	.....	1.15	.....	1.15	1.15	1.15	1.15	1.15
Ammonium								
Ammonia anhydrous Com. tanks	.....	.05½	.....	.05½	.05½	.05½		
Ammonia, anhyd, 100 lb cyl. lb.	.15¼	.15½	.15¼	.15½	.15½	.15½	.14½	.14
Water, 26°, 800 lb dr del lb.	.....	.03½	.....	.03½	.03½	.03½	.03½	.03½
Ammonia, aqua 26° tanks	.....	.02½	.02½	.02½	.02½	.02½		
Acetate lb.	.28	.39	.28	.39	.39	.28		
Bicarbonate, bbls., f.o.b. plant 100 lb.	.....	5.15	.....	5.15	5.15	5.15	6.50	5.15
Bifluoride, 300 lb bbls lb.	.21	.22	.21	.22	.22	.21	.22	.21
Carbonate, tech, 500 lb cs. lb.	.10½	.12	.09	.12	.12	.09	.12	.09
Chloride, white, 100 lb. bbls wks 100 lb.	4.45	5.15	4.45	5.15	5.15	4.45	5.15	4.45
Gray, 250 lb bbls wks lb.	5.25	5.75	5.25	5.75	5.75	5.25	5.75	5.25
Lump, 500 lb cks spot lb.	.11	.11½	.11	.11½	.11½	.11	.11½	.11
Lactate, 500 lb bbls lb.	.15	.16	.15	.16	.16	.15	.16	.15
Ammonium Linoleate lb.	.15	.15	.15	.....	.....	.....	.....	.....
Nitrate, tech, casks lb.	.06	.10	.06	.10	.10	.06	.10	.06
Persulfate, 112 lb kegs lb.	.26	.30	.26	.30	.30	.26	.34	.26
Phosphate, tech, powd, 325 lb bbls lb.	.11½	.12	.11½	.12	.13	.11½	.13	.12½
Sulfate, bulk c-1 100 lb.	1.75	1.80	1.70	1.80	2.10	1.75	2.40	2.05
Southern points 100 lb.	1.75	1.80	1.70	1.75	2.10	1.82½	2.45	2.05
Nitrate, 26% nitrogen 31.6% ammonia imported bags c. i. f. ton	34.60	35.00	34.60	35.00	57.60	45.00	60.85	52.40
Sulfocyanide, kegs lb.	.36	.48	.36	.48	.48	.36	.48	.36
Amyl Acetate, (from pentane) Tanks lb.	.....	.222	.....	.222	.236	.222	1.70	1.60
Tech., drs lb.	.225	.236	.225	.236	.24	.225	.24	.23
Alcohol, see Fusel Oil								
Furoate, 1 lb tins lb.		5.00	.....	5.00	5.00	5.00		
Aniline Oil, 960 lb drs lb.	.14½	.16	.14½	.16	.16	.15	.16½	.15
Annatto, fine lb.	.34	.37	.34	.37	.37	.34	.37	.34
Anthraquinone, sublimed, 125 lb bbls lb.	.50	.55	.50	.55	.90	.50	.90	.80
Antimony, metal slabs, ton lots lb.	.06½	.06½	.06½	.07½	.09½	.06½	.10	.08½
Needle, powd, 100 lb cs lb.	.08½	.09	.08½	.09	.09½	.08	.10	.09
Chloride, soln (butter of) cbys lb.	.13	.17	.13	.17	.17	.13	.18	.13
Oxide, 500 lb bbls lb.	.08½	.08½	.08½	.08½	.08½	.07½	.10	.08½
Salt, 66%, tins lb.	.22	.24	.22	.24	.24	.22	.26	.24
Sulfuret, golden, bbls lb.	.16	.20	.16	.20	.20	.16	.20	.16
Vermilion, bbls lb.	.38	.42	.38	.42	.42	.38	.42	.38
Archil, conc, 600 lb bbls lb.	.17	.19	.17	.19	.19	.17	.19	.17
Double, 600 lb bbls lb.	.12	.14	.12	.14	.14	.12	.14	.12
Triple, 600 lb bbls lb.	.12	.14	.12	.14	.14	.12	.16	.12
Argols, 80% casks lb.	.....	.18½	.....	.18½	.18½	.18½	.18½	.18½
Crude, 30%, casks lb.	.07	.07½	.07	.08	.08	.07½	.08	.08

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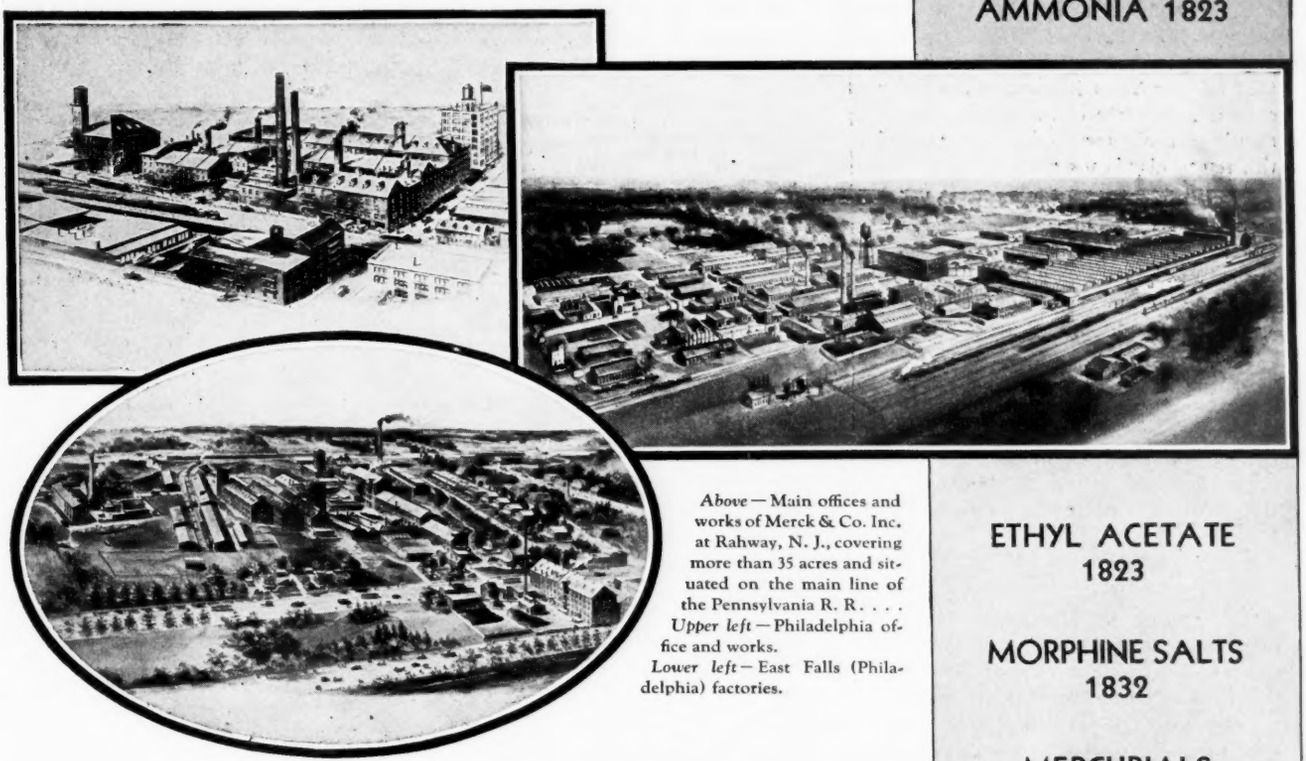

Above — Main offices and works of Merck & Co. Inc. at Rahway, N. J., covering more than 35 acres and situated on the main line of the Pennsylvania R. R. . . . *Upper left* — Philadelphia office and works. *Lower left* — East Falls (Philadelphia) factories.

ETHYL ACETATE
1823

MORPHINE SALTS
1832

MERCURIALS
1834

STRYCHNINE
1834

IODIDES
1836

CODEINE SALTS
1836

BISMUTH SALTS
1836

SILVER SALTS
1836

ETC., ETC.

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - May 1931 $1.369

and that they were booking orders for immediate shipment. United States exports of borax during 1930 were 82,932 tons compared with 79,883 for the preceding year. The exports for the first two months of 1931 were 13,213 tons. In 1929 the chief countries of destination were Germany, United Kingdom, France, the Netherlands, and Japan. It is assumed that this combined increase of the borax exports in the face of world-wide depression is primarily due to the greater use of this commodity in the glass industry.

Bromine — There has been no price change in the market for this commodity in several months. Considerable interest was aroused by the announcement that the Dow Company was going into the manufacture directly from seawater and that a plant was to be erected near Wilmington in close proximity to the Ethyl Co., plant. The production of bromine in France during 1930 amounted to 565 metric tons. Of this quantity 258 tons were produced by the State potash mines, 200 tons by the Kali Sainte-Therese potash company, and 107 tons by the Cie. Alais Froges et Camargues (Pechiney).

Butyl Acetate — In line with most of the other solvents this item was in slightly better demand than has prevailed for some months. While spot sales were spotty the price structure was firm and unchanged.

Calcium Acetate — Some improvement was noticeable in withdrawals. Acetic acid producers were reporting larger shipments into the textile industry and this served to stabilize the lime market.

Calcium Chloride — The warm weather of the past two weeks stimulated both sales and inquiries and producers were optimistic over the prospects of a record tonnage. The exports of calcium chloride from Germany during 1930 were 18,433 metric tons, compared with 20,330 metric tons for 1929. The exports to the United States were 6,325 metric tons, to Great Britain 2,265 metric tons, to Canada 1,415 metric tons and to Argentina 1,277 metric tons.

Carnauba Wax—The acute shortage of local stocks was eased somewhat during the past two weeks of the month and prices were off from the highs registered in April. Carnauba Wax exports from Brazil during 1930 amounted to 6,714 metric tons, valued at $2,524,036. Exports during 1929 totaled 6,433 metric tons, valued at $2,921,191. Exports continue to be made chiefly to the United States, Germany, and Great Britain. While, as in other export commodities, prices declined, the carnauba wax trade did not suffer so

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Aroclors, wks. lb.	.20	.40	.20	.40	.40	.20	.....	.....
Arsenic, Red. 224 lb kegs, cs. lb.	.09½	.10	.09½	.10	.11	.08½	.11	.09
White, 112 lb kegs. lb.	.04	.05	.03¾	.05	.04½	.03¾	.04½	.04
Asbestine, c-l wks. ton	.....	15.00	.....	15.00	15.00	15.00	15.00	4.75
Barium								
Barium Carbonate, 200 lb bags wks. ton	58.00	60.00	58.00	60.00	60.00	58.00	60.00	57.00
Chlorate, 112 lb kegs NY. lb.	.14	.15	.14	.15	.15	.14	.15	.14
Chloride, 600 lb bbl wks. ton	63.00	69.00	63.00	69.00	69.00	63.00	69.00	63.00
Dioxide, 88%, 690 lb drs. lb.	.12	.13	.12	.13	.13	.12	.13	.12
Hydrate, 500 lb bbls. lb.	.04½	.05½	.04¼	.05½	.05½	.04¼	.05½	.04¼
Nitrate, 700 lb casks. lb.	.07½	.08¼	.07½	.08¼	.08¼	.07½	.08¼	.08
Barytes, Floated, 350 lb bbls wks. ton	23.00	24.00	23.00	24.00	24.00	23.00	24.00	23.00
Bauxite, bulk, mines. ton	5.00	6.00	5.00	8.00	8.00	5.00	8.00	5.00
Beeswax, Yellow, crude bags. lb.	.24	.31	.24	.31	.34	.24	.37	.34
Refined, cases. lb.	.....	.37	.....	.37	.38	.37	.42	.39
White, cases. lb.	.34	.36	.34	.36	.53	.34	.53	.51
Benzaldehyde, technical, 945 lb drums wks. lb.	.60	.65	.60	.65	.65	.60	.65	.60
Benzene								
Benzene, 90%, Industrial, 8000 gal tanks wks. gal.	.....	.20	.20	.21	.22	.21	.23	.23
Ind. Pure, tanks works. gal.	.....	.20	.20	.21	.22	.21	.23	.23
Benzidine Base, dry, 250 lb bbls. lb.	.65	.67	.65	.67	.74	.65	.74	.70
Benzoyl, Chloride, 500 lb drs. lb.	.45	.47	.45	.47	1.00	.45	1.00	1.00
Benzyl, Chloride, tech drs. lb.	.....	.30	.....	.30	.25	.25	.25	.25
Beta-Naphthol, 250 lb bbl wk. lb.	.22	.24	.22	.24	.24	.22	.26	.22
Naphthylamine, sublimed, 200 lb bbls. lb.	1.25	1.35	1.25	1.35	1.35	1.25	1.35	1.35
Tech, 200 lb bbls. lb.	.58	.65	.58	.65	.65	.53	.68	.60
Blanc Fixe, 400 lb bbls wks. ton	75.00	90.00	75.00	90.00	90.00	75.00	90.00	75.00
Bleaching Powder								
Bleaching Powder, 300 lb drs c-l wks contract. 100 lb.	2.00	2.35	2.00	2.35	2.35	2.00	2.25	2.00
Blood, Dried, fob, NY. Unit	2.75	3.00	2.70	3.00	3.90	3.00	4.60	3.90
Chicago. Unit	2.20	2.35	2.20	2.35	4.50	2.75	5.00	4.40
S. American shipt. Unit	2.95	3.20	2.95	3.20	4.10	3.15	4.70	4.25
Blues, Bronze Chinese Milori Prussian Soluble. lb.	.....	.35	.....	.35	.35	.35	.35	.32
Bone, raw, Chicago. ton	31.00	32.00	31.00	32.00	39.00	31.00	42.00	39.00
Bone, Ash, 100 lb kegs. lb.	.06	.07	.06	.07	.07	.06	.07	.06
Black, 200 lb bbls. lb.	.05½	.08¼	.05½	.08¼	.08¼	.05½	.08¼	.08¼
Meal, 3% & 50%, Imp. ton	.....	31.00	.....	31.00	31.00	31.00	35.00	30.00
Borax, bags. lb.	.02½	.03½	.02½	.03½	.03½	02½	.03¾	.02½
Bordeaux, Mixture, 16% pwd. lb.	.11½	.13	.11½	.13	.14	.12	.14	.10½
Paste, bbls. lb.	.11½	.13	.11½	.13	.14	.12	.14	.10
Brazilwood, sticks, shpmt. lb.	26.00	28.00	26.00	28.00	28.00	26.00	28.00	26.00
Bromine, cases. lb.	.36	.43	.36	.43	.47	.38		
Bronze, Aluminum, powd blk. lb.	.60	1.20	.60	1.20	1.20	.60	1.20	.60
Gold bulk. lb.	.55	1.25	.55	1.25	1.25	.55	1.25	.55
Butyl, Acetate, normal drs. lb.	.17	.175	.17	.175	.20	.17	.195	.184
Tank, wks. lb.	.16	.175	.16	.175	.186	.16	.186	.181
Aldehyde, 50 gal drs wks. lb.	.34	.44	.34	.44	.44	.34	.70	.34
Carbitol s ee Diethylene Glycol Mono (Butyl Ether)	.....	.....	.....	.....	.....	.....	.....	.....
Cellosolve (see Ethylene glycol mono butyl ether)								
Furoate, tech., 50 gal. dr., lb.	.....	.50	.....	.50	.50	.50	.50	.50
Propionate, drs. lb.	.22	.25	.22	.25	.27	.22	.36	.25
Stearate, 50 gal drs. lb.	.25	.30	.25	.30	.30	.25	.60	.25
Tartrate, drs. lb.	.55	.60	.55	.60	.60	.55	.60	.57
Cadmium, Sulfide, boxes. lb.	.80	.90	.80	.90	1.75	.90	1.75	.75
Calcium								
Calcium, Acetate, 150 lb bags c-l. 100 lb.	.....	2.00	.....	2.00	4.50	2.00	4.50	4.50
Arsenate, 100 lb bbls c-l wks. lb.	.07	.09	.07	.09	.09	.07	.09	.07
Carbide, drs. lb.	.05	.06	.05	.06	.06	.05	.06	.05
Carbonate, tech, 100 lb bags c-l. lb.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, Flake, 375 lb drs c-l wks. ton	.....	22.75	.....	22.75	22.75	22.75	25.00	22.75
Solid, 650 lb drs c-l fob wks ton	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Nitrate, 100 lb bags. ton	40.00	43.00	40.00	43.00	43.00	40.00	52.00	42.00
Peroxide, 100 lb. drs. lb.	.....	1.25	.....	1.25	1.25	1.25	1.25	1.25
Phosphate, tech, 450 lb bbls lb.	.08	.08¼	.08	.08¼	.08¼	.08	.08	.07
Stearate, 100 lb bbls. lb.	.18	.22	.18	.22	.26	.19	.26	.25
Calurea, bags S. points. c.i.f. ton	.....	88.65	.....	88.65	88.65	88.65	88.15	82.15
Camwood, Bark, ground bbls. lb.	.....	.18	.....	.18	.18	.18	.18	.18
Candelilla Wax, bags. lb.	.14½	.15	.13	.15	.20	.15	.24	.22
Carbitol, (See Diethylene Gycol Mono Ethyl Ether)	.....	.....	.....	.....	.....	.....	.....	.....
Carbon, Decolorizing, 40 lb bags c-l. lb.	.08	.15	.08	.15	.15	.08	.15	.08
Black, 100-300 lb cases lc-l NY. lb.	.06	.12	.06	.12	.12	.06	.12	.12
Bisulfide, 500 lb drs lc-l NY. lb.	.05½	.06	.05½	.06	.06	.05½	.06	.05½
Dioxide, Liq. 20-25 lb cyl. lb.	.....	.06	.....	.06	.18	.06	.06	.06
Tetrachloride, 1400 lb drs delivered. lb.	.06½	.07	.06½	.07	.07	.06½	.07½	.06½
Carnauba Wax, Flor, bags. lb.	.26	.28	.26	.28	.37	.28	.43	.35
No. 1 Yellow, bags. lb.	.37	.39	.23	.40	.33	.25	.40	.33
No. 2 N Country, bags. lb.	.18½	.20	.18	.23	.27	.20	.32	.28
No. 2 Regular, bags. lb.	.22	.23	.21	.23	.30	.23	.36	.31
No. 3 N. C. lb.	.14½	.15	.14½	.16	.23	.16	.25	.24
No. 3 Chalky. lb.	.15	.15½	.14	.15½	.23	.16	.26	.24
Casein, Standard, Domestic. ground. lb.	.07	.08	.07	.10	.15½	.09½	.17	.15

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greatly as did many other lines. The States of Ceara and Piauhy are the largest producers and exporters.

Carbon Black — The price situation showed no signs of improvement in the face of little demand from buyers and actual sales were reported as being made at 3c Texas.

Casein — The weak position of this commodity continued. Prices were not reduced further during the month but shading was in evidence on worthwhile orders. Competition from foreign material was said to be much keener.

Chlorine — With the volume of shipments expanding for water treatment the market presented a very firm appearance both for tankcar and cylinders.

Copper — The metal reached a new low figure when it touched 8½c on a large order for twelve million pounds but the bulk of the sales that were made as the month closed brought 8¾c. World production of copper showed further decline in April due partly to shorter month and partly to actual reduction of output, but daily production continues to be above low made in January. Production of copper for the world in April came to 128,677 short tons, daily average of 4,280 tons, according to American Bureau of Metal Statistics, compared with 136,458 and 4,402 tons in March, 128,685 and 4,596 in February, and 129,390 and 4,174 tons in January. April world output last year came to 150,595 tons with daily average 5,020 tons. Reduction in production of copper was mainly in the United States.

Copper Sulfate — Producers rather unexpectedly cut the price on May 22 to $3.90 per 100 lbs., f. o. b. New York for carlot quantities. With the usual differentials for special packings and quantities. In some quarters this move was not entirely unexpected as the producers had based the former price on 10c copper and they have now been buying at better than this figure. The demand for agricultural purposes was said to be quite satisfactory.

Copperas — Further recession in the steel mills has prevented any surplus stocks while the demand from the textile centers showed improvement. Prices remained very firm.

Cresylic Acid — A firmer tone was in evidence with sales and shipments into the resin field indicating further expansion. Consumption by the mining companies however is considerably below normal as most producers are operating mines at very restricted pace.

	Current Market	1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Cellosolve (see Ethylene glycol mono ethyl ether)							
Acetate (see Ethylene glycol mono ethyl ether acetate)							
Celluloid, Scraps, Ivory cs....lb.	.13	.15	.13	.15	.20	.20	.30	.20
Shell, cases....lb.	.18	.20	.18	.20	.20	.18	.20	.18
Transparent, cases....lb.	.....	.15	.....	.15	.15	.15	.32	.15
Cellulose, Acetate, 50 lb kegs..lb.	.80	1.25	.80	1.25	1.25	.80	1.25	1.20
Chalk, dropped, 175 lb bbls...lb.	.03	.03½	.03	.03½	.03½	.03	.03½	.03
Precip, heavy, 560 lb cks...lb.	.02	.03½	.02	.03½	.03½	.02	.03½	.02
Light, 250 lb casks....lb.	.02½	.03½	.02½	.03½	.03½	.02½	.03½	.02½
Charcoal, Hardwood, lump, bulk wks....bu.	.18	.19	.18	.19	.19	.18	.19	.18
Willow, powd, 100 lb bbl wks....lb.	.06	.06½	.06	.06½	.06½	.06	.06½	.06
Wood, powd, 100 lb bbls...lb.	.04	.05	.04	.05	.05	04	.05	.04
Chestnut, clarified bbls wks,..lb.	.02	.03	.02	.03	.03	.02½	.02	.03½
25% tks wks....lb.	.01½	.02½	.01½	.02½	.02½	.01½	.02½	.01½
Powd, 60%, 100 lb bgs wks.lb.	.....	.04½	.....	.04½	.04½	.04½	.04 4/5	.04½
Powd, decolorized bgs wks..lb.	.05½	.06	.05½	.06	.06	.05½	.06	.05½
China Clay, lump, blk mines.ton	8.00	9.00	8.00	9.00	9.00	8.00	9.00	8.00
Powdered, bbls....lb.	.01½	.02	.01½	.02	.02	.01½	.02	.01½
Pulverized, bbls wks....ton	10.00	12.00	10.00	12.00	12.00	10.00	12.00	10.00
Imported, lump, bulk....ton	15.00	25.00	15.00	25.00	25.00	15.00	25.00	15.00
Powdered, bbls....lb.	.01½	.03	.01½	.03	.03	.01½	.03½	.01½
Chlorine								
Chlorine, cyls lc-1 wks contract ....lb.	.07	.08½	.07	.08½	.08½	.07	.08½	.07
cyls, cl wks,. contract ...lb.	.04	.04½	.04	.04½	.04½	.04	.04½	.04½
Liq tank or multi-car lot cyls wks contract....lb.	.01½	.02½	.01½	.02½	.025	.01½	.03	.025
Chlorobenzene, Mono, 100 lb. drs lc-1 wks....lb.	.10	.10½	.10	.10½	.10½	.10	.10½	.08½
Chloroform, tech, 1000 lb drs..lb.	.15	.16	.15	.16	.16	.15	.20	.16
Chloropicrin, comml cyls....lb.	1.00	1.35	1.00	1.35	1.35	1.00	1.35	1.00
Chrome, Green, CP....lb.	.26	.29	.26	.29	.29	.26	.29	.26
Commercial....lb.	.06½	.11	.06½	.11	.11	.06½	.11	.06½
Yellow....lb.	.16	.18	.16	.18	.18	.16	.18	.15
Chromium, Acetate, 8% Chrome bbls....lb.	.04½	.05½	.04½	.05½	.05½	.04½	.05½	.04½
20° soln, 400 lb bbls....lb.	.....	.05½	.....	.05½	.05½	.05½	.05½	.05½
Fluoride, powd, 400 lb bbl..lb.	.27	.28	.27	.28	.28	.27	.28	.27
Oxide, green, bbls....lb.	.34½	.35½	.34½	.35½	.35½	.34½	.35½	.34½
Coal tar, bbls....bbl	10.00	10.50	10.00	10.50	10.50	10.00	10.50	10.00
Cobalt Oxide, black, bags....lb.	2.10	2.22	2.10	2.22	2.22	2.10	2.22	2.10
Cochineal, gray or black bag..lb.	.52	.57	.52	.57	1.01	.52	1.01	.95
Teneriffe silver, bags....lb.	.....	.57	.55	.57	.95	.54	.95	.95
Copper								
Copper, metal, electrol....100 lb.	8.50	8.75	8.50	10.36	17.78	9.50	24.00	17.00
Carbonate, 400 lb bbls....lb.	.08½	.16½	.08½	.16½	.21½	.08½	.25	.13
Chloride, 250 lb bbls....lb.	.22	.25	.22	.25	.28	.22	.28	.25
Cyanide, 100 lb drs....lb.	.41	.42	.41	.42	.45	.41	.60	.44
Oxide, red, 100 lb bbls....lb.	.15½	.18	.15½	.18	.32	.15½	.32	.16½
Sub-acetate verdigris, 400 lb bbls....lb.	.18	.19	.18	.19	.19	.18	.19	.18
Sulfate, bbls c-1 wks...100 lb.	3.90	4.60	3.90	4.95	5.50	3.95	7.00	5.50
Copperas, crys and sugar bulk c-1 wks....ton	13.00	14.00	13.00	14.00	14.00	13.00	14.00	13.00
Cotton, Soluble, wet, 100 lb bbls....lb.	.40	.42	.40	.42	.42	.40	.42	.40
Cottonseed, S. E. bulk c-1...ton	.....	26.50	.....	26.50	.....	.....	.....	.....
Meal S. E. bulk....ton	.....	.....	.....	.....	.....	.....	.....	.....
7% Amm., bags mills...ton	37.50	38.00	37.50	38.00	38.00	37.50	38.00	37.50
Cream Tartar, USP, 300 lb. bbls....lb.	.24	.24½	.24	.24½	.27	.24½	.28	.26½
Creosote, USP, 42 lb cbys....lb.	.40	.42	.40	.42	.42	.40	.42	.40½
Oil, Grade 1 tanks....gal.	.13	.14	.13	.14	.16	.15	.19	.15
Grade 2....gal.	.11	.12	.11	.12	.14	.13	.23	.13
Grade 3....gal.	.11	.12	.11	.12	.14	.13	.28	.13
Cresol, USP, drums....lb.	.13	.17	.13	.17	.17	.14	.17	.14
Crotonaldehyde, 50 gal dr....lb.	.32	.36	.32	.36	.36	.32	.36	.32
Cudbear, English....lb.	.16	.17	.16	.17	.17	.16	.17	.16
Cutch, Rangoon, 100 lb bales..lb.	.11	.13	.11	.13	.13	.11	.16	.12½
Borneo, Solid, 100 lb bale..lb.	.06½	08½	.06½	.08½	.08½	.06½	.08½	.08
Cyanamide, bulk c-1 wks Nitrogen unit....lb.	.....	1.64	.....	1.64	2.00	1.70	2.00	2.00
Dextrin, corn, 140 lb bags..100 lb.	3.47	3.67	3.47	4.02	4.82	4.42	4.92	4.62
White, 140 lb bags....100 lb.	3.42	3.67	3.42	4.02	4.77	4.17	4.87	4.57
Potato, Yellow, 220 lb bgs..lb.	.08	.09	.08	.09	.09	.08	.09	.08
White, 220 lb bags lc-1....lb.	.08	.09	.08	.09	.09	.08	.09	.08
Tapioca, 200 lb bags lc-1..lb.	.08½	.08¾	.08¾	.08¾	.08¾	.08	.08¾	.08
Diamylphthalate, drs wks...gal.	.....	3.80	.....	3.80	3.80	3.80	3.80	3.80
Dianisidine, barrels....lb.	2.35	2.70	2.35	2.70	2.70	2.35	3.10	2.70
Dibutylphthalate, wks....lb.	.24½	.28	.24½	.28	.28	.24½	.26½	.26½
Dibutyltartrate, 50 gal drs...lb.	.29½	.31½	.29½	.31½	.31½	.29½	.31½	.29½
Dichloroethylether, 50 gal drs lb.	.....	.06	.....	.06	.07	.05	.13	.05
Dichloromethane, drs wks....lb.	.55	.65	.55	.65	.65	.55	.65	.55
Diethylamine, 400 lb drs....lb.	2.75	3.00	2.75	3.00	3.00	2.75	3.00	2.75
Diethylcarbonate, drs ....gal.	1.85	1.90	1.85	1.90	1.90	1.85	1.90	1.85
Diethylaniline, 850 lb drs....lb.	.55	.60	.55	.60	.60	.55	.60	.55
Diethyleneglycol, drs....lb.	.14	.16	.14	.16	.13	.10	.13	.10
Mono ethyl ether, drs....lb.	.....	.16	.....	.16	.16	.13	.15	.13
Mono butyl ether, drs....lb.	.24	.30	.24	.30	.30	.24	.30	.25
Diethylene oxide, 50 gal dr....lb.	.....	.50	.....	.50	.50	.50	.50	.50
Diethylorthotoluidin, drs....lb.	.64	.67	.64	.67	.67	.64	.67	.64
Diethyl phthalate, 1000 lb drums....lb.	.24	.26	.24	.26	.26	.24	.26	.24
Diethylsulfate, technical, 50 gal drums....lb.	.30	.35	.30	.35	.35	.30	.35	.30
Dimethylamine, 400 lb drs...lb.	.....	2.62	.....	2.62	2.62	2.62	2.62	2.62
Dimethylaniline, 340 lb drs...lb.	.26	.28	.26	.28	.28	.26	.32	.26

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Egg Yolk — In an effort to stimulate business, prices were substantially reduced during the month.

Ethyl Acetate — The competitive situation prevailing for the past few months was less in evidence in May although no change in prices was announced.

Glaubers Salt — The market was rather spotty with sales and shipments of the crystal off considerably from normal. Demand for the anhydrous was better.

Gums — The gum market continued to work towards still lower levels during the month just closed. With the exception of one or two items quotations were below the close of the market in April. Demand was off in most quarters with No. 1 Damar showing strong tendencies in the face of the general dullness. According to foreign advices received by the Department of Commerce exports of kauri gum from Auckland during 1930 totaled 8,552,000 pounds, approximating $922,000 in value as compared with 11,059,000 pounds, valued at $1,301,000 shipped during 1929. Although the market for kauri gum has been somewhat depressed during the early months of 1931, reports indicate that greater activity of trading may be expected in the near future. An Auckland warehouse fire destroyed a large stock of gum recently, which will have to be replaced to meet orders. Increased domestic buying is anticipated and the overseas market has shown signs of improvement. Mechanical digging operations reported previously are being carried on at Tomarata, near Wellsford and near Awanui, North Auckland, for the purpose of making the production of kauri gum chips a more profitable business. Two light mobile motor driven shovels now in use are expected to carry the work on effectively which formerly required 60 hand laborers.

Glycerine — This commodity continued to reflect the lessened demand and with the past anti-freeze season particularly dissapointing stocks are above normal. The price on the C. P. grade was lowered on May 21 to 12c in drums a reduction of ½c. Exports of glycerin from the United States during the first quarter of 1931 aggregated 78,204 pounds, valued at $10,715, as against 115,911 pounds, with a value of $16,988 in the same period of 1930. During the 1931 first quarter general imports of crude glycerin amounted to 2,914,104 pounds, valued at $166,795, compared with 1,082, 825 pounds, with a value of $66,403, in the corresponding period of 1930. Imports of refined glycerin totaled 485,204 pounds,

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Dimethylsulfate, 100 lb drs...lb.	.45	.50	.45	.50	.50	.45	.50	.45
Dinitrobenzene, 400 lb bbls...lb.	.15½	.16½	.15½	.16½	.16½	.15½	.16½	.15
Dintrochlorobenzene, 400 lb bbls.....lb.	.13	.15	.13	.15	.15	.13	.15	.1
Dinitronaphthalene, 350 lb bbls .....lb.	.34	.37	.34	.37	.37	.34	.37	.34
Dinitrophenol, 350 lb bbls....lb.	.29	.30	.29	.30	.32	.31	.32	.31
Dinitrotoluene, 300 lb bbls...lb.	.16	.17	.16	.17	.18	.16	.19	.17
Diorthotolyguanidine, 275 lb bbls wks.....lb.	.42	.46	.42	.46	.46	.42	.49	.42
Dioxan (See Diethylene Oxide)	.....	.....	.....	.....	.....	.....	.....	.....
Diphenyl.....lb.	.20	.40	.20	.40	.50	.20	.50	.40
Diphenylamine.....lb.	.37	.38	.37	.38	.40	.38	.47	.40
Diphenylguanidine, 100 lb bbl lb.	.30	.35	.30	.35	.35	.30	.40	.30
Dip Oil, 25%, drums.....lb.	.26	.30	.26	.30	.30	.26	.30	.26
Divi Divi pods, bgs shipmt..ton	28.00	29.00	28.00	35.00	46.50	35.00	57.00	46.50
Extract.....lb.	.05	.05½	.05	.05½	.05½	.05	.05½	.05
Egg Yolk, 200 lb cases.....lb.	.45	.47	.45	.58	.80	.72	.84	.77
Epsom Salt, tech, 300 lb bbls c-l NY.....100 lb.	1.70	1.90	1.70	1.90	1.90	1.70	1.90	1.70
Ether, USP, 600 lb. drs.....lb.	.21	.28	.21	.28	.28	.21	.39	.38
Anhydrous, C.P. 300 lb. drs.lb.	.....	.40	.....	.40	.40	.40		
Ethyl Acetate, 85% Ester, ... tanks.....lb.	.....	.08	.08	.088	.115	.085	.122	.108
drums.....lb.	.09	.095	.09	.10	.158	.094	.129	.111
Anhydrous, tanks.....lb.	.....	.119	.....	.119	.142	.119		
drums.....lb.	.115	.121	.115	.121	.156	.115		
Acetoacetate, 50 gal drs....lb.	.65	.68	.65	.68	.68	.65	.68	.65
Benzylaniline, 300 lb drs...lb.	.88	.90	.88	.90	1.11	.88	1.11	1.05
Bromide, tech, drums .....lb.	.50	.55	.50	.55	.55	.50	.55	.50
Carbonate, 90%, 50 gal drs gal.	1.85	1.90	1.85	1.90	1.90	1.85	1.90	1.85
Chloride, 200 lb. drums....lb.	.....	.22	.....	.22	.22	.22	.22	.22
Chlorocarbonate, cbys.....lb.	.....	.30	.....	.30	.40	.30	.40	.35
Ether, Absolute, 50 gal drs..lb.	.50	.52	.50	.52	.52	.50	.52	.50
Furoate, 1 lb tins .....lb.	.....	5.00	.....	5.00	5.00	5.00	5.00	5.00
Lactate, drums works.....lb.	.25	.29	.25	.29	.29	.25	.35	.25
Methyl Ketone, 50 gal drs..lb.	.....	.30	.....	.30	.30	.30	.30	.30
Oxalate, drums works.....lb.	.45	.55	.45	.55	.55	.45	.55	.45
Oxybutyrate, 50 gal drs wks.lb.	.....	.30½	.....	.30½	.30½	.30½	.36	.30
Ethylene Dibromide, 60 lb dr .lb.	.....	.70	.....	.70	.70	.70	.70	.79
Chlorhydrin, 40%, 10 gal cbys. chloro. cont.....lb.	.75	.85	.75	.85	.85	.75	.85	.75
Dichloride, 50 gal drums...lb.	.05	.07	.05	.07	.07	.05	.10	.05
Glycol, 50 gal drs wks.....lb.	.25	.28	.25	.28	.28	.25	30	.25
Mono Butyl Ether drs wks.	.25	.27	.25	.27	.27	.23	.31	.23
Mono Ethyl Ether drs wks	.17	.20	.17	.20	.20	.16	.24	.16
Mono Ethyl Ether Acetate dr. wks.....	.19½	.23	.19½	.23	.23	.19	.26	.19
Mono Methyl Ether, drs.lb.	.21	.23	.21	.23	.23	.19	.23	.19
Stearate.....	.18	.18	.18	.....	.....	.....	.....	.....
Oxide, cyl.....lb.	.....	2.00	.....	2.00	2.00	2.00		
Ethylidenaniline.....lb.	.45	.47½	.45	.47½	.47½	.45	.65	.45
Feldspar, bulk.....ton	15.00	20.00	15.00	20.00	25.00	15.00	25.00	20.00
Powdered, bulk works.....ton	15.00	21.00	15.00	21.00	21.00	15.00	21.00	15.00
Ferric Chloride, tech, crystal 475 lb bbls.....lb.	.05	.07½	.05	.07½	.07½	.05	.09	.05
Fish Scrap, dried, wks.....unit	4.20&10	4.25&10	4.20&10	4.25&10	4.35&10	3.90&10	4.25&10	3.65&10
Acid, Bulk 7 & 3½% delivered Norfolk & Balt. basis...unit	.....	3.50&50	.....	3.50 & 50	3.50&50	3.20&50	4.00&50	3.50&50
Fluorspar, 98%, bags.....	41.00	46.00	41.00	46.00	46.00	41.00	46.00	41.00
Formaldehyde								
Formaldehyde, aniline, 100 lb. drums.....lb.	.37½	.42	.37½	.42	.42	.37½	.42	.37
USP, 400 lb bbls wks.....lb.	.06	.07¼	.06	.07¼	.08	.06	.10	.08½
Fossil Flour.....lb.	.02½	.04	.02½	.04	.04	.02½	.04	.02½
Fullers Earth, bulk, mines..ton	15.00	20.00	15.00	20.00	20.00	15.00	20.00	15.00
Imp. powd 5-1 bags.....ton	24.00	30.00	24.00	30.00	30.00	24.00	30.00	25.00
Furfural (tech.) drums, wks..lb.	.....	.10	.....	.10	.15	.10	.19½	.17
Furfuramide (tech) 100 lb dr..lb.	.....	.30	.....	.30	.30	.30	.30	.30
Furfuryl Acetate, 1 lb tins....lb.	.....	5.00	.....	5.00	5.00	5.00	5.00	5.00
Alcohol, (tech) 100 lb dr....lb.	.....	.50	.....	.50	.50	.50	.50	.50
Furoic Acid (tech) 100 lb dr...lb.	.....	.50	.....	.50	.50	.50	1.00	.50
Fusel Oil, 10% impurities ...gal.	.. ..	1.35	.....	1.35	1.35	1.35	1.35	1.35
Fustic, chips.....lb.	.04	.05	.04	.05	.05	.04	.05	.04
Crystals, 100 lb boxes.....lb.	.20	.22	.20	.22	.22	.20	.22	.20
Liquid, 50°, 600 lb bbls....lb.	.09	10	.09	.10	.10	.09	.10	.09
Solid, 50 lb boxes.....lb.	.14	.16	.14	.16	.16	.14	.16	.14
Sticks.....ton	25.00	26.00	25.00	26.00	26.00	25.00	26.00	25.00
G Salt paste, 360 lb bbls.....lb.	.45	.50	.45	.50	.50	.45	.52	.45
Gall Extract.....lb.	.18	.20	.18	.20	.20	.18	.21	.18
Gambier, common 200 lb cs...lb.	.06½	.07	.06½	.07	.07	.06	.07	.06
25% liquid, 450 lb bbls....lb.	.08	.10	.08	.10	.10	.08	.14	.08
Singapore cubes, 150 lb bg..lb.	.09½	.09	.09½	.09	.09	.08½	.09	.08½
Gelatin, tech, 100 lb cases....lb.	.45	.50	.45	.50	.50	.45	.50	.45
Glauber s Salt, tech, c-l wks.....100 lb.	1.00	1.70	1.00	1.70	1.70	1.00	1.70	.70
Glucose (grape sugar) dry 70-80° bags c-l NY.....100 lb.	3.24	3.34	3.24	3.34	3.34	3.24	3.34	3.20
Tanner's Special, 100 lb bags .....100 lb.	.....	3.14	.....	3.14	3.14	3.14	3.14	3.14
Glue, medium white, bbls ...lb.	.22	.24	.22	.24	.24	.20	.24	.20
Pure white, bbls.....lb.	.25	.26	.25	.26	.26	.22	.26	.22
Glycerin, CP, 550 lb drs.....lb.	.12	.12½	.12	.14½	.14½	.12½	.16	.13½
Dynamite, 100 lb drs.....lb.	.10	.10½	.10	.12½	.12½	.11	.12½	.10½
Saponification, tanks.....lb.	.07	.07½	.07	.07½	.08	.07½	.08½	.07½
Soap Lye, tanks.....lb.	.06	.06½	.06	.07	.07½	.06½	.07½	.06½
Graphite, crude, 220 lb bgs...ton	15.00	35.00	15.00	35.00	35.00	15.00	35.00	15.00
Flake, 500 lb bbls.....lb.	.06	09	.06	.09	.09	.06	.09	06
Gums								
Gum Accroides, Red, coarse and fine 140-150 lb bags.....lb.	.03½	.04½	.03½	.04½	.04½	.03½	.04½	.03
Powd, 150 lb bags.....lb.	.06	.06½	.06	.06½	.06½	.06	.06½	.06½

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - May 1931 $1.369

valued at $42,366. January to March, inclusive, 1931; against 318,178 pounds, valued at $31,797, in the January-March period, 1930.

Lead — The price of $3.75 was reached at New York in the face of a very light demand. Producers felt that consumers were only partially covered for the next thirty days and that any price movement would be in the opposite direction. United States production of refined lead amounted to 38,439 short tons in April against 44,800 tons in March and 64,067 tons in April, 1930, according to American Bureau of Metal Statistics. Stocks of refined lead in the United States exclusive of refined lead produced from ore or base bullion of foreign origin were 132,993 tons at the close of April compared with 130,426 tons a month earlier and 42,015 tons at the end of April, 1930. Stocks of refined lead in hands of United States smelters and refiners on May 1 totaled 132,993 short tons compared with 130,426 tons April 1, 122,826 tons February 1, 1931, and 42,015 tons May 1, 1930, according to American Bureau of Metal Statistics. Production at United States smelters and refineries in April came to 38,439 tons of which 35,498 tons were from domestic ore. This compared with 44,800 and 41,775 tons, respectively, in March, 44,118 and 39,464 tons in February, 1931, and 64,067 and 55,547 tons in April, 1930. Shipments in April came to 35,872 tons compared with 37,200 in March, 34,437 in February, 1931, and 64,521 in April, 1930.

Lead Acetate — The various grades of this chemical were reduced on May 18, ½c, bringing the salt more in line with the lower prices prevailing for the metal. Brown is now quoted at 9½c; white broken, 11c; crystal, 10½c. United States export trade in white lead increased from 11,815,480 pounds, valued at $921,510 in 1929 to 13,092,212 pounds, valued at $923,281 in 1930. Larger shipments during 1930 to Great Britain, outstanding market for white lead, offset a general decline in shipments to other major markets. Sales to the United Kingdom in 1930 amounted to 9,499,448 pounds valued at $632,060, a gain of over 40 per cent in quantity and 30 per cent in value as compared with the export shipments during 1929 to that market. The Philippine Islands moved into second position as a result of larger shipments during 1930, exports increasing from 455,105 pounds, worth $47,912 in 1929, to 759,876 pounds valued at $74,154. Shipments to Argentina, third ranking market amounted to 868,454 pounds, having a value of $67,890 in 1930.

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Yellow, 150-200 lb bags....lb.	.18	.20	.18	.20	.20	.18	.20	.18
Animi (Zanzibar) bean & pea 250 lb cases.....lb.	.35	.40	.35	.40	.40	.35	.40	.35
Glassy, 250 lb cases.....lb.	.50	.55	.50	.55	.55	.50	.55	.50
Asphaltum, Barbadoes (Manjak) 200 lb bags.....lb.	.09	.12	.09	.12	.12	.09	.12	.09
Egyptian, 200 lb cases.....lb.	.15	.17	.15	.17	.17	.15	.17	.15
Gilsonite Selects, 200 lb bags .....ton	58.00	65.00	58.00	65.00	65.00	58.00	65.00	58.00
Damar Batavia standard 136, lb cases.....lb.	.10	.10½	.11½	.13	.20	.14	.26	.22
Batavia Dust, 160 lb bags.....lb.	.05	.05½	.05½	.06	.11	.06	.11	.10½
E Seeds, 136 lb cases.....lb.	.06	.06½	.07	.08	.13	.08	.17½	.15
F Splinters, 136 lb cases and bags.....lb.	.05½	.06	.06½	.07½	.13½	.07	.13½	.13
Singapore, No 1, 224 lb cases lb.	.15	.15½	.13½	.15	.24	.18½	.30½	.26
No. 2, 224 lb cases.....lb.	.08	.08½	.08½	.10	.20½	.13	.24	.21½
No. 3, 180 lb bags.....lb.	.04½	.05	.05	.06	.11½	.07	.14	.10
Benzoin Sumatra, U. S. P. 120 lb cases.....lb.	.30	.33	.30	.34	.40	.33	.40	.38
Copal Congo, 112 lb bags, clean opaque.....lb.	.16½	.17	.16	.17	.17	.16	.17	.14
Dark, amber.....lb.	.06	.07	.06½	.07½	.08	.07½	.09	.08½
Light, amber.....lb.	.12½	.14	.12½	.14	.14	.12½	.14	.12½
Water white.....lb.	.37	.45	.37	.45	.45	.37	.36	.35
Mastic.....lb.	.50	.52	.48	.58	.65	.57	.65	.58
Manila, 180-190 lb baskets								
Loba A.....lb.	.10	.11	.11	.13	.17½	.13	.17½	.17
Loba B.....lb.	.08	.08½	.09	.10½	.16½	.13½	.16½	.15½
Loba C.....lb.	.07½	.08	.08½	.10	.14	.10	.14½	.13½
M A Sorts.....lb.	.05	.05½	.05½	.06½	.....	.....	.....	.....
D B B Chips.....lb.	.06	.06½	.07	.08	.....	.....	.....	.....
East Indies chips, 180 lb bags lb.	.05	.05½	.05	.05½	.11	.09	.11	.10
Pale bold, 224 lb cs.....lb.	.15½	.16	.15½	.16	.21	.17½	.21	.20
Pale nubs, 180 lb bags....lb.	.08	.08½	.08	.09	.16	.12½	.16	15
Pontianak, 224 lb cases....								
Bold gen No 1.....lb.	.15½	.16	.16	.17	.21	.19	.23	.20
Gen chips spot.....lb.	.07	.08	.07	.08½	.15	.13½	.15	.14½
Elemi, No. 1, 80-85 lb cs...lb.	.09	.09½	.10	.12	.14	.12½	.14	.13½
No. 2, 80-85 lb cases.....lb.	.08½	.09	.09½	.11½	.13½	.12	.13½	.13
No. 3, 80-85 lb cases.....lb.	.08	.08½	.08½	.11	.13	.11	.13	.12
Kauri, 224-226 lb cases No. 1	.42	.48	.43	.50	.57	.48	.57	.50
No. 2 fair pale.....lb.	.24	.25	.26	.29	.38	.32	.38	.35
Brown Chips, 224-226 lb cases.....lb.	.10	.12	.10	.12	.12	.10	.12	.10
Bush Chips, 224-226 lb. cases.....lb.	.26	.28	.28	.34	.40	.38	.40	.38
Pale Chips, 224-226 lb cases .....lb.	.19	21	.19	.22	.26	.24½	.26	.24½
Sandarac, prime quality, 200 lb bags & 300 lb casks...lb.	.18	.20	.18	.22	.40	.27	.72	.35
Helium, 1 lit. bot.....lit.	.....	25.00	.....	25.00	25.00	25.00	.20	.17
Hematine crystals, 400 lb bbls lb.	.14	.18	.14	.18	.18	.14	.20	.14
Paste, 500 bbls.....lb.	.....	.11	.....	.11	.11	.11	.11	.11
Hemlock 25%, 600 lb bbls wks lb.	.03	.03½	.03	.03½	.03½	.03	.03¾	.03
Bark.....ton	.....	16.00	.....	16.00	16.00	16.00	17.00	16.00
Hexalene, 50 gal drs wks.....lb.	.....	.60	.....	.60	.60	.60	.60	.60
Hexamethylenetetramine, drs .lb.	.46	.50	.46	.50	.50	.46	.58	.48
Hoof Meal, fob Chicago....unit	.....	2.50	.....	2.50	3.75	2.50	4.00	3.75
South Amer. to arrive....unit	.....	2.70	.....	2.70	3.75	2.70	3.90	3.75
Hydrogen Peroxide, 100 vol, 140 lb cbys.....lb.	.21	.24	.21	.24	.26	.21	.26	.24
Hydroxyamine Hydrochloride lb.	.....	3.15	.....	3.15	3.15	3.15		
Hypernic, 51°, 600 lb bbls....lb.	.12	.15	.12	.15	.15	.12	.15	.12
Indigo Madras, bbls.....lb.	1.28	1.30	1.28	1.30	1.30	1.28	1.30	1.28
20% paste, drums.....lb.	.15	.18	.15	.18	.18	.15	.18	.15
Synthetic, liquid.....lb.	.....	.12	.....	.12	.12	.12	.12	.12
Iron Chloride, see Ferric or Ferrous								
Iron Nitrate, kegs.....lb.	.09	.10	.09	.10	.10	.09	.10	.09
Coml, bbls.....100 lb.	2.50	3.25	2.50	3.25	3.25	2.50	3.25	2.50
Oxide, English.....lb.	.10	.12	.10	.12	.12	.10	.12	.10
Red, Spanish.....lb.	.02½	.03½	.02½	.03½	.03½	.02½	.03½	.02½
Isopropyl Acetate, 50 gal drs gal.	.85	.90	.85	.90	.90	.85	.90	.85
Japan Wax, 224 lb cases.....lb.	.10	.10½	.09¾	.11	.15½	.11½	.18	.16
Kieselguhr, 95 lb bgs NY..... Brown.....ton	60.00	70.00	60.00	70.00	70.00	60.00	70.00	60.00
Lead Acetate, bbls wks...100 lb.	9.50	10.00	9.50	11.00	13.50	10.50	13.50	13.00
White crystals, 500 lb bbls wks.....100 lb.	10.50	11.00	10.50	12.25	14.50	11.50	14.50	14.00
Arsenate, drs lc-1 wks.....lb.	.11	.13	.11	.14	.16	.13	.15	.13
Dithiofuroate, 100 lb dr....lb.	.....	1.00	.....	1.00	1.00	1.00		
Metal, c-1 NY.....100 lb.	3.75	4.00	3.75	4.60	7.75	5.10	7.75	6.10
Nitrate, 500 lb bbls wks....lb.	.13	.14	.13	.14	.14	.13	.14	.14
Oleate, bbls.....lb.	.17½	.18	.17½	.18	.18	.17½	.18	.17½
Oxide Litharge, 500 lb bbls.lb.	.07½	.08	.07½	.08	.08½	.08½	.08½	.08½
Red, 500 lb bbls wks....lb.	.07½	.08½	.07½	.08½	.09½	.08½	.09½	.09½
White, 500 lb bbls wks...lb.	.07½	.08	.07½	.08	.09½	.07½	.09½	.09
Sulfate, 500 lb bbls wk...lb.	.06½	.07	.06½	.07	.08½	.06½	.08½	.08½
Leuna saltpetre, bags c.i.f...ton	.....	57.60	.....	57.60	57.60	57.60	57.00	52.00
S. points c. i. f.....ton	.....	57.90	.....	57.90	57.90	57.90	57.30	52.30
Lime, ground stone bags.....ton	.....	4.50	.....	4.50	4.50	4.50	4.50	4.50
Live, 325 lb bbls wks...100 lb.	.....	1.05	.....	1.05	1.05	1.05	1.05	1.05
Lime Salts, see Calcium Salts								
Lime-Sulfur soln bbls.....gal.	.15	.17	.15	.17	.17	.15	.17	.15
Lithopone, 400 lb bbls lc-1 wks .....lb.	.04¾	.05	.04¾	.05	.05¾	.04¾	.06¾	.05¾
Logwood, 51°, 600 lb bbls.....lb.	.07	.08	.07	.08	.08¼	.07	.08¼	.08¼
Chips, 150 lb bags.....lb.	.03	.03½	.03	.03½	.03½	.03	.03½	.03
Solid, 50 lb boxes.....lb.	.12	.12½	.12	.12½	.12½	.12¼	.12½	.12½
Sticks.....ton	24.00	26.00	24.00	26.00	26.00	24.00	26.00	24.00
Lower grades.....lb.	.07½	.08	.07½	.08	.08	.07½	.08	.07½
Madder, Dutch.....lb.	.22	.25	.22	.25	.25	.22	.25	.22
Magnesite, calc, 500 lb bbl...ton	50.00	60.00	50.00	60.00	60.00	50.00	60.00	50.00

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - May 1931 $1.369

Mercury — The strength exhibited last month was carried into May with prices being held firmly at $102-$103. As the month closed however announcement was made that the Board of Directors of Mercurio Europeo at its annual meeting had reduced the price to £16-15-0 per flask. The reason given for this action was that it was hoped that further business would be stimulated and also because the price of other metals had been radically reduced in the past fifteen months.

Methanol Synthetic — Producers announced on May 8 a reduction of 3c, the new schedule calling for 37½c in tanks and 39½c in drums. No change was announced on the 95% or 97% grades. Statistical data for the domestic production of refined methanol in the first quarter of the current year show a 30% drop in the output of the wood distillation product and a 40% increase in the synthetic variety compared with the corresponding quarter of 1930. Production statistics follow: The first line is production, second, shipments, and third, stocks as of March 31.

1st Quarter 1930		*1st Quarter 1931*	
Wood Distillation Gallons	*Synthetic Gallons*	*Wood Distilltaion Gallons*	*Synthetic Gallons*
1,131,927	1,545,742	783,011	2,164,521
1,158,397	1,408,676	588,088	1,404,148
436,952	657,173	499,978	1,856,413

Exports of methanol from the United States in the first quarter of 1931 amounted to 93,580 gallons valued at $45,304 decreasing from the 115,215 gallons, valued at $73,791 shipped in the corresponding period of 1930.

Naphthalene — The seasonal demand as far as the manufacturers were concerned was said to be largely over. Prices were held at published levels despite some drop in volume. Imports into the United States during 1930 of naphthalene solidifying at less than 79°C aggregated 27,666,834 pounds, a 21 per cent drop from 1929 imports when 35,007,419 pounds were brought in. The United Kingdom registered a gain of over five million pounds and assumed the position of leading supplier formerly held by Germany. In 1930, Russia supplied 33,069 pounds of naphthalene of this grade. The following table details general imports of naphthalene (less than 79°C) into the United States by countries of shipment.

Potash — The N. V. Potash has announced in a letter to the trade the following prices:

We wish to advise that until further notice our prices on potash salts for agricultural purposes for shipment from Europe between May 1 and December 31, 1931, will be as follows:

	Current Market	1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Magnesium							
Magnesium Carb, tech, 70 lb bags NY....lb.	.06	.06½	.06	.06½	.06½	.06	.06½	.06
Chloride flake, 375 lb. drs c-l wks....ton	.....	36.00	.....	36.00	36.00	36.00	36.00	36.00
Imported shipment....ton	31.75	33.00	31.75	33.00	33.00	31.75	33.00	33.00
Fused, imp, 900 lb bbls NY ton	.....	31.00	.....	31.00	31.00	31.00	31.00	31.00
Fluosilicate, crys, 400 lb bbls wks....lb.	.10	.10½	.10	.10½	.10½	.10	.10½	.10
Oxide, USP, light, 100 lb bbls ....lb.	.....	.42	.....	.42	.42	.42	.42	.42
Heavy, 250 lb bbls....lb.	.....	.50	.....	.50	.50	.50	.50	.50
Peroxide, 100 lb cs....lb.	1.00	1.25	1.00	1.25	1.25	1.00	1.25	1.00
Silicofluoride, bbls....lb.	.09½	.10½	.09½	.10½	.10½	.09½	.10½	.09½
Stearate, bbls....lb.	.24	.26	.24	.26	.26	.25	.26	.25
Manganese Borate, 30%, 200 lb bbls....lb.	.....	.19	.....	.19	.19	.19	.24	.19
Chloride, 600 lb casks....lb.	.07½	.08½	.07½	.08½	.08½	.07½	.08½	.08
Dioxide, tech (peroxide) drs lb.	.03½	.06	.03½	.06	.06	.03½	.06	.04½
Ore, Powdered or granular.. 75-80%, bbls....lb.	.02½	.03	.02½	.03	.03	.02½	.03½	.02½
80-85%, bbls....lb.	.....	.03½	.....	.03½	.03½	.03½	.04½	.03½
85-88%, bbls....lb.	.04	.04½	.04	.04½	.04½	.04	.05½	.04
Sulfate, 550 lb drs NY....lb.	.07	.08	.07	.08	.08	.07	.08½	.07
Mangrove 55%, 400 lb bbls..lb.	.03½	Nom.	.03½	Nom.	Nom.	.03½	Nom.	.03½
Bark, African....ton	25.50	26.00	25.50	29.75	33.00	29.75	35.00	30.00
Marble Flour, bulk....ton	14.00	15.00	14.00	15.00	15.00	14.00	15.00	14.00
Mercurous chloride ....lb.	.....	2.05	.....	2.05	2.05	2.05	2.05	2.05
Mercury metal....76 lb flask	101.00	102.00	101.00	106.00	124.50	106.00	126.00	120.00
Meta-nitro-aniline....lb.	.67	.69	.67	.69	.69	.67	.74	.67
Meta-nitro-para-toluidine 200 lb. bbls....lb.	1.40	1.55	1.40	1.55	1.55	1.50	1.55	1.50
Meta-phenylene-diamine 300 lb. bbls....lb.	.80	.84	.80	.84	.84	.80	.90	.80
Meta-toluene-diamine, 300 lb bbls....lb.	.67	.69	.67	.69	.69	.67	.72	.67
Methanol								
Methanol, (Wood Alcohol),.... 95%....gal.	.33	.35	.33	.37	.48	.35	.65	.51
97%....gal.	.34	.39	.34	.43	.49	.39	.65	.53
Pure, Synthetic drums cars gal.	.39½	.41½	.39½	.42½	.50	.42½	.68	.53
Synthetic tanks....gal.	.37½	.38	.37½	.40½	.50	.40½	.66	.54
Methyl Acetate, drums....gal.	.. ..	Nom.	.....	Nom.	Nom.	Nom.	.95	.95
Acetone,....gal.	.50	.55	50	.70	.77	.65	.85	.73
Anthraquinone,....lb.	.85	.95	.85	.95	.85	.70	.95	.85
Cellosolve, (See Ethylene Glycol Mono Methyl Ether)	.....	.....	.....	.....	.....	.....	.....	.....
Chloride, 90 lb cyl....lb.	.45	.45	.45	.45	.45	.45	.60	.45
Furoate, tech., 50 gal. dr.,.lb.	.....	.50	.....	.50	.50	.50	.50	.50
Mica, dry grd. bags wks....lb.	65.00	80.00	65.00	80.00	80.00	65.00	80.00	65.00
Wet, ground, bags wks....lb.	110.00	115.00	110.00	115.00	115.00	110.00	115.00	110.00
Michler's Ketone, kegs....lb.	.....	3.00	.....	3.00	3.00	3.00	3.00	3.00
Monochlorobenzene, drums see, Chorobenzene, mono....lb.								
Monomethylparaminosufate 100 lb drums....lb.	3.75	4.00	3.75	4.00	4.00	3.75	4.20	3.75
Montan Wax, crude, bags....lb.	.05½	.07	.05½	.07	.07	.06	.07	.06½
Myrobalans 25%, liq bbls....b	.03½	.04½	.03½	.04½	.04½	.03½	.04½	.03½
50% Solid, 50 lb boxes....lb.	.05	.05½	.05	.05½	.05½	.05	.08½	.05
J1 bags....ton	34.00	35.00	34.00	35.00	41.00	34.00	43.00	40.00
J 2 bags....ton	19.50	20.00	19.00	22.50	26.50	19.75	40.00	26.50
R 2 bags....ton	18.25	18.50	18.75	20.00	27.50	19.00	34.00	27.50
Naphtha, v. m. & p. (deodorized) bbls....gal.	.17	.18	.17	.18	.16	.16	.18	.16
Naphthalene balls, 250 lb bbls wks....lb.	.03¾	.04¾	.03¾	.04¾	.05½	.03¾	.05½	.05½
Crushed, chipped bgs wks..lb.	.....	.04	.....	.04	.04½	.04	.04½	.04½
Flakes, 175 lb bbls wks....lb.	.....	.03¾	.....	.03¾	.05	.03¾	.05	.05
Nickel Chloride, bbls kegs....lb.	.18	.20	.18	.21	.21	.20	.24	.20
Oxide, 100 lb kegs NY....lb.	.37	.40	.37	.40	.40	.37	.40	.37
Salt bbl. 400 bbls lb NY...lb.	.10½	.13	.10½	.13	.13	.10½	.13	.13
Single, 400 lb bbls NY....lb.	.10½	.12	.10½	.12	.13	.10½	.13	.13
Metal ingot ....lb.	.35	.35	.35	.....	.....	.....	.....	.....
Nicotine, free 40%, 8 lb tins, cases....lb.	1.25	1.30	1.25	1.30	1.30	1.25	1.30	1.25
Sulfate, 10 lb tins....lb.	.98½	1.20	.98½	1.20	1.20	.98½	1.20	.98½
Nitre Cake, bulk ....ton	12.00	14.00	12.00	14.00	18.00	12.00	18.00	12.00
Nitrobenzene, redistilled, 1000 lb drs wks....lb.	.09	.09½	.09	.09½	.09½	.09	.10½	.09
Nitrocellulose, c-l-l-cl, wks...lb.	.25	.36	.25	.36	.36	.25	.36	.25
Nitrogenous Material, bulk..unit	2.10	2.20	2.10	2.70	3.40	2.50	4.00	3.40
Nitronaphthalene, 550 lb bbls.lb.	.....	.25	.....	.25	.25	.25	.25	.25
Nitrotoluene, 1000 lb drs wks.lb.	.14	.15	.14	.15	.15	.14	.15	.14
Nutgalls Aleppy, bags....lb.	.16	.16½	.16	.16½	.16½	.16	.16½	.16
Chinese, bags....lb.	.12	.13	.12	.13	.13	.12	.13	.12
Oak Bark, ground....ton	30.00	35.00	30.00	35.00	35.00	30.00	50.00	30.00
Whole....ton	20.00	23.00	20.00	23.00	23.00	20.00	23.00	20.00
Orange-Mineral, 1100 lb casks NY....lb.	.11¾	.13	.11¾	.13	.13	.11¾	.13½	.11¾
Orthoaminophenol, 50 lb kgs..lb.	2.15	2.25	2.15	2.25	2.25	2.15	2.25	2.15
Orthoanisidine, 100 lb drs....lb.	2.50	2.60	2.50	2.60	2.60	2.50	2.60	2.50
Orthochlorophenol, drums....lb.	.50	.65	.50	.65	.65	.50	.65	.50
Orthocresol, drums....lb.	.25	.25	.25	.25	.35	.18	.28	.18
Orthodichlorobenzene, 1000 lb drums....lb.	.07	.10	.07	.10	.10	.07	.10	.07
Orthonitrochlorobenzene, 1200 lb drs wks....lb.	.30	.33	.30	.33	.33	.30	.33	.30
Orthonitrotoluene, 1000 lb drs wk....lb.	.16	.18	.16	.18	.18	.16	.18	.16
Orthonitrophenol, 350 lb dr...lb.	.85	.90	.85	.90	.90	.85	.90	.85
Orthotoluidine, 350 lb bbl 1c-1 lb.	.28	30	.25	.30	.30	.25	.30	.25

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - May 1931 $1.369

	In 200-lb. bags	*In bulk*
Muriate of potash 80-85% KCl, basis 80% KCl	$37.15	$35.55
Sulphate of potash 90-95% K_2SO_4, basis 90% K_2SO_4	48.25	....
Sulphate of potash-magnesia 48-53% K_2SO_4, basis 48% K_2SO_4	27.80	....
Manure salts min. 30% K_2O, basis 30% K_2O	....	19.15
High-grade kainit min. 20% K_2O	....	12.65
Kainit min. 14% K_2O	....	9.70

All per ton of 2,000 pounds, net weight, c.i.f. ports of Boston, New York, Philadelphia, Baltimore, Norfolk, Wilmington, N. C.; Charleston, Savannah, Brunswick, Jacksonville, Tampa, Pensacola, Mobile, Gulfport, New Orleans and Houston, provided quantities ordered for any particular port are sufficient to enable seller to obtain freight space at reasonable freight rates. The above prices are for potash salts to be used for agricultural purposes in the Continental United States and are guaranteed against reduction in our prices on potash salts of like grade and quality until April 30, 1932. All bagged salts are sold on foreign weights, tares and analyses; bulk salts on American weights and foreign analyses.

Discounts.—The following discounts will be allowed:

On orders with specifications placed prior to June 1, 1931, for prompt shipment	11%
June 1, 1931, for shipment in equal monthly quantities, June to September, 1931, inclusive	10%
July 1, 1931, for July shipment	7%
August 1, 1931, for August shipment	6%
September 1, 1931, for September shipment	5%
October 1, 1931, for shipment in equal monthly quantities, October to December, 1931, inclusive	4%
October 1, 1931, for October shipment	4%
November 1, 1931, for November shipment	3%
December 1, 1931, for December shipment	2%

Ex Store Deliveries.—On material ordered for delivery ex store there will be an extra charge of $1.25 per ton of 2,000 pounds at northern ports (Boston to Baltimore, inclusive), an $1 per ton at southern and Gulf ports (Norfolk to Houston, inclusive), which charge is net and not subject to any discounts or rebates. This additional charge will provide delivery at northern ports basis f.o.b. cars place of shipment; delivery at southern and Gulf ports basis ex vessel place of shipment; wharfage and handling for buyer's account.

Terms of Payment.—Net cash in New York funds by sight draft or by four months' approved bank acceptance bearing interest at the rate of six per cent (6%) per annum, payable in New York, in exchange for delivery order or foreign documents at seller's option. Exchange and collection charges are for account of the buyer. Seller reserves the right to require buyer to establish a confirmed irrevocable letter of credit.—N. V. Potash Export My., Inc., New York Office of Amsterdam, Holland.

	Current Market	1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Orthonitroparachlorphenol, tins ..... lb.	.70	.75	.70	.75	.75	.70	.75	.70
Osage Orange, crystals ..... lb.	.16	.17	.16	.17	.17	.16	.17	.16
51 deg. liquid ..... lb.	.07	.07½	.07	.07½	.07½	.07	.07½	.07
Powdered, 100 lb bags ..... lb.	.14½	.15	.14½	.15	.15	.14½	.15	.14½
Paraffin, refd, 200 lb cs slabs 123-127 deg. M. P. ..... lb.	.03¼	.03	.03¼	.03	.04¼	.03¼	.06¼	.04¼
128-132 deg. M. P. ..... lb.	.03½	.03½	.03½	.03¾	.06½	.03½	.07	.04½
133-137 deg. M. P. ..... lb.	.04¼	.07¼	.04¼	.07¼	.07¼	.04¼	.07¼	.06¼
Para Aldehyde, 110-55 gal drs. lb.	.20½	.23	.20½	.23	.23	.20½	.28	.20½
Aminoacetanilid, 100 lb bg. lb.	.52	.60	.52	.60	1.05	.52	1.05	1.00
Aminohydrochloride, 100 lb kegs ..... lb.	1.25	1.30	1.25	1.30	1.30	1.25	1.30	1.25
Aminophenol, 100 lb kegs ..... lb.	.82	.84	.82	.86	1.02	.92	1.15	.99
Chlorophenol, drums ..... lb.	.50	.65	.50	.65	.65	.50	.65	.50
Coumarone, 330 lb drums. lb.	.....	.....	.....	.....	.....	.....	.....	.....
Cymene, refd, 110 gal dr. gal.	2.25	2.50	2.25	2.50	2.50	2.25	2.50	2.25
Dichlorobenzene, 150 lb bbls wks ..... lb.	.15½	.16	.15½	.20	.20	.17	.20	.17
Nitroacetanilid, 300 lb bbls. lb.	.50	.55	.50	.55	.55	.50	.55	.50
Nitroaniline, 300 lb bbls wks ..... lb.	.48	.55	.48	.55	.55	.48	.55	.48
Nitrochlorobenzene, 1200 lb drs wks ..... lb.	.23	26	.23	.26	.26	.23	.26	23
Nitro-orthotoluidine, 300 lb bbls ..... lb.	2.75	2.85	2.75	2.85	2.85	2.75	2.85	2.75
Nitrophenol 185 lb bbls .... lb.	.45	50	.45	.50	.50	.45	.55	.45
Nitrosodimethylaniline, 120 lb. bbls ..... lb.	.92	.94	.92	.94	.94	.92	.94	.92
Nitrotoluene, 350 lb bbls. ... lb.	.29	.31	.29	.31	.31	.29	.31	.29
Phenylenediamine, 350 lb bbls ..... lb.	1.15	1.20	1.15	1.20	1.20	1.15	1.20	1.15
Toluenesulfonamide, 175 lb bbls ..... lb.	.70	.75	.70	.75	.75	.70	.75	.70
Toluenesulfonchloride, 410 lb bbls wks ..... lb.	.20	.22	.20	.22	.22	.20	.22	.20
Toluidine, 350 lb bbls wk. . lb.	.43	.44	.40	.44	.40	.38	.42	.38
Paris Green, Arsenic Basis 100 lb kegs ..... lb.	.....	.27	.....	.27	.27	.27	.27	25
250 lb kegs ..... lb.	.....	.25	.....	.25	.25	.25	.25	.23
Persian Berry Ext., bbls ..... lb.	.25	Nom.	.25	Nom.	Nom.	.25	25	.25
Pentasol (see Alcohol, Amyl) ...								
Pentasol Acetate (see Amyl Acetate)								
Petrolatum, Green, 300 lb bbl. lb.	.02	.02½	.02	.02½	.02½	.02	.02½	.02
Phenol, 250-100 lb drums ..... lb.	.14¼	.15	.14¼	.15	.15	.14¼	.16	.13
Phenyl - Alpha - Naphthylamine, 100 lb kegs ..... lb.	.....	1.35	.....	1.35	1.35	1.35	1.35	1.35
Phenylhydrazine Hydrochloride ..... lb.	2.90	3.00	2.90	3.00	3.00	2.90		
Phosphate								
Phosphate Acid (see Superphosphate)								
Phosphate Rock, f.o.b. mines Florida Pebble, 68% basis. . ton	3.10	3.25	3.10	3.25	3.15	3.00	3.15	3.00
70% basis ..... ton	3.75	3.90	3.75	3.90	4.00	3.75	4.00	3.50
72% basis ..... ton	4.25	4.35	4.25	4.35	4.50	4.25	4.50	4.00
75-74% basis ..... ton	5.25	5.50	5.25	5.50	5.50	5.25	5.50	5.00
75% basis ..... ton	.....	5.75	.....	5.75	5.75	5.75	5.75	5.75
77-80% basis ..... ton	.....	6.25	.....	6.25	6.25	6.25	6.25	6.25
Tennessee, 72% basis ..... ton	.....	5.00	.....	5.00	5.00	5.00	5.00	5.00
Phosphorous Oxychloride 175 lb cyl ..... lb.	.18	.20	.18	.20	.25	.18	.40	.20
Red, 110 lb cases ..... lb.	.37½	.42	.37½	.42	.42	.37½	.60	.37½
Yellow, 110 lb cases wks. . lb.	.31	.37½	.31	.37½	.37½	.31	.32	.31
Sesquisulfide, 100 lb cs ..... lb.	.....	.44	.....	.44	.44	.44	.46	.44
Trichloride, cylinders ..... lb.	.18	.20	.18	.20	.25	.18	.35	.20
Phthalic Anhydride, 100 lb bbls wks ..... lb.	.15	.16	.15	.16	.20	.15	.20	.18
Pigments Metallic, Red or brown bags, bbls, Pa. wks ..... ton	37.00	45.00	37.00	45.00	45.00	37.00	45.00	37.00
Pine Oil, 55 gal drums or bbls Destructive dist ..... lb.	.63	.64	.63	.64	.64	.63	.64	.63
Prime bbls ..... bbl.	8.00	10.60	8.00	10.60	10.60	8.00	10.60	8.00
Steam dist. bbls ..... gal.	.65	.70	.65	.70	.70	.65	.70	.65
Pitch Hardwood, ... wks ..... ton	35.00	45.00	35.00	45.00	45.00	35.00	45.00	40.00
Plaster Paris, tech, 250 lb bbls ..... bbl.	3.30	3.50	3.30	3.50	3.50	3.30	3.50	3.30
Platinum, Refined ..... oz.	27.00	28.00	27.00	28.00	.....	.....	.....	.....
Potash								
Potash, Caustic, wks, solid ... lb.	.06¼	.06¼	.06¼	.06¼	.06¼	.06¼	.07¼	.06¼
flake ..... lb.	.0705	08	.0705	.08	.08	.0705	.07½	.0705
Potash Salts, Rough Kainit 12.4% basis bulk ..... ton	.....	9.20	.....	9.20	9.20	9.10	9.10	9.00
14% basis ..... ton	.....	9.70	.....	9.70	9.70	9.60	9.60	9.50
Manure Salts								
20% basis bulk ..... ton	.....	12.65	.....	12.65	12.65	12.50	12.50	12.40
30% basis bulk ..... ton	.....	19.15	.....	19.15	19.15	18.95	18.95	18.75
Potassium Acetate ..... lb.	.28	.30	.28	.30	.30	.27		
Potassium Muriate, 80% basis bags ..... ton	.....	37.15	.....	37.15	37.15	36.75	36.75	36.40
Pot. & Mag. Sulfate, 48% basis bags ..... ton	.....	27.80	.....	27.80	27.80	27.50	27.50	27.00
Potassium Sulfate, 90% basis bags ..... ton	.....	48.25	.....	48.25	48.25	47.75	47.75	47.30
Potassium Bicarbonate, USP, 320 lb bbls ..... lb.	.09½	.10	.09½	.10	.10	.09½	.14	.09½
Bichromate Crystals, 725 lb casks ..... lb.	.08¾	.09½	.08¾	.09½	.09½	.08¾	.09½	.09
Powd., 725 lb cks wks .... lb.	.13	.13½	.13	.13½	.13½	.13	.13½	.13

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - May 1931 $1.369

Potassium Chlorate — Demand from fireworks manufacturers was exceptionally heavy and producers were holding very firmly to published quotations.

Shellac — Prices worked to slightly lower levels during the past month with the demand off somewhat in most consuming lines from the high of last March. A check of leading producers revealed however that sales for the first five months of 1931 were actually but slightly off from the same period of 1930. Statistics released by the Department of Commerce state that the fluctuation of shallac prices at Calcutta reflects the unsettled conditions prevailing in India during 1930. Prices of $26.64 per maund of 82 pounds were being quoted on January 1 and by the end of the month quotations had dropped to $23.72 per maund. There was a continual reduction in prices during succeeding months and quotations around $10.68 maund prevailed when the market closed on December 30. Exports of orange, button, and garnet lac during the calendar year 1930 totaled 47,032,000 pounds, a decrease of 12,560,000 pounds from the preceding year. Direct shipments to the United States amounted to 16,137,800 pounds during 1930 as compared with 25,751,500 during 1929. Seedlac and sticklac exports during 1930 amounted to 17,239,500 pounds, an increase of 625,000 pounds over shipments in 1929. United States took 8,849,600 pounds during 1930, a gain of 3,434,000 pounds in direct shipments as contrasted with the preceding year. Estimated stocks in Calcutta warehouses did not exceed 4,100,000 pounds at any time during the year under review, while formerly stocks of 30,000,000 pounds were not considered abnormal. Supplies of lac available at interior can not be estimated with any degree of accuracy at present.

Soda Ash — Actual volume of shipments in May were ahead of April, but most of this tonnage was against existing contracts. Spot sales continued to be very light.

Soda Caustic — The undertone of this market continues to improve with spot sales being made at published prices. Shipments against contracts are said to be smaller, consumers preferring to order only for actual immediate needs. The petroleum industry was taking larger shipments than usual.

Sodium Nitrate — The price of $2.05 remained unchanged in the face of rather poor demand from the agricultural field. The chief center of interest of fixed nitro-

	Current Market	1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Binoxiate, 300 lb bbls.....lb.	.14	.14	.17	.17	.14	.17	.14
Bisulfate, 100 lb kegs.....lb.	.....	.....	.30	.30	.30	.30	.30
Carbonate, 80-85% calc. 800 lb casks.....lb.	.05½	.05½	.05½	.05½	.05½	.05½	.05½
Chlorate crystals, powder 112 lb keg wks.....lb.	.08	.08	.08½	.09	.08	.09	.08½
Chloride, crys bbls.....lb.	.05½	.05½	.06	.06	.05½	.05½	.05½
Chromate, kegs.....lb.	.23	.23	.28	.28	.23	.28	.23
Cyanide, 110 lb. cases.....lb.	.55	.55	.57½	.57½	.55	.57½	.55
Metabisulfite, 300 lb. bbl...lb.	.12	.12	.13	.13	.12	.13	.11
Oxalate, bbls.....lb.	.20	.20	.24	.24	.20	.24	.16
Perchlorate, casks wks.....lb.	.11	.11	.12	.12	.11	.12	.11
Permanganate, USP, crys 500 & 100 lb drs wks.....lb.	.16	.16	.16½	.16½	.16	.16½	.16
Prussiate, red, 112 lb keg...lb.	.38	.38	.40	.40	.38	.40	.38
Yellow, 500 lb casks.....lb.	.18½	.18½	.21	.21	.18½	.21	.18½
Tartrate Neut, 100 lb keg..lb.	.....	.....	.21	.21	.21	.51	.51
Titanium Oxalate, 200 lb bbls .....lb.	.21	.21	.23	.23	.21	.25	.21
Propyl Furoate, 1 lb tins.....lb.	.....	5.00	.....	5.00	5.00	5.00	5.00
Pumice Stone, lump bags.....lb.	.04	.04	.05	.05	.04	.05	.04
250 lb bbls.....lb.	.04½	.04½	.06	.06	.04½	.06	.04½
Powdered, 350 lb bags.....lb.	.02½	.02½	.03	.03	.02½	.03	.02½
Putty, commercial, tubs..100 lb.	.....	.....	.03½	.03½	.03½	.03½	.03½
Linseed Oil, kegs.....100 lb.	.....	.....	.05½	.05½	.05½	.05½	.05½
Pyridine, 50 gal drums.....gal.	1.50	1.50	1.75	1.75	1.50	1.75	1.50
Pyrites, Spanish cif Atlantic ports bulk.....unit	.13	.13	.13½	.13½	.13	.13½	.13
Quebracho, 35% liquid tks....lb.	.02½	.02½	.04	.04	.02½	.04	.03
450 lb bbls c-l.....lb.	.03½	.03½	.03½	.03½	.03½	.04½	.03½
35% Bleaching, 450 lb bbl .lb.	.04½	.04½	.05½	.04½	.05½	.04½	.05½
Solid, 63%, 100 lb bales cif..lb.	.05	.05	.05½	.05½	.05	.05½	.05½
Clarified, 64%, bales.....lb.	.....	.05½	.....	.05½	.05½	.05½	.05½
Quercitron, 51 deg liquid 450 lb bbls.....lb.	.05½	.05½	.06	.06	.05½	.06	.05½
Solid, 100 lb boxes.....lb.	.09½	.09½	.13	.13	.09½	.13	.10
Bark, Rough.....ton	.....	14.00	.....	14.00	14.00	14.00	14.00
Ground.....ton	34.00	34.00	34.00	35.00	34.00	35.00	34.00
R Salt, 250 lb bbls wks.....lb.	.40	.40	.44	.45	.40	.46	.44
Red Sanders Wood, grd bbls..lb.	.....	.....	.18	.18	.18	.18	.18
Resorcinol Tech, cans.....lb.	.90	.90	1.25	1.25	.90	1.25	1.15
Rosin Oil, 50 gal bbls, first run .....gal.	.52	.52	.58	.58	.56	.62	.57
Second run.....gal.	.56	.56	.61	.61	.59	.64	.60

Rosin

Rosins 600 lb bbls 280 lb...unit ex. yard N. Y.							
B.....	.....	4.55	4.15	4.95	7.75	5.35	9.25	7.45
D.....	.....	5.15	4.60	5.50	8.00	5.50	9.25	7.70
E.....	.....	5.55	4.85	5.90	8.17	5.52½	9.27	8.30
F.....	.....	5.75	5.05	6.20	8.45	5.55	9.27	8.40
G.....	.....	6.15	5.15	6.25	8.45	5.60	9.45	8.40
H.....	.....	6.40	5.20	6.30	8.55	5.60	9.50	8.40
I.....	.....	6.50	5.25	6.35	8.58	5.62½	9.50	8.40
K.....	.....	6.60	5.40	6.45	8.65	5.62½	9.55	8.45
M.....	.....	6.85	5.65	6.70	8.80	5.65	9.85	8.50
N.....	.....	7.20	6.15	6.95	8.95	6.05	10.30	8.93
WG.....	.....	8.90	7.65	8.15	9.25	6.85	11.30	9.00
WW.....	.....	8.90	8.40	8.90	9.85	7.85	12.30	9.30
Rotten Stone, bags mines....ton	24.00	20.00	24.00	20.00	30.00	18.00	30.00	24.00
Lump, imported, bbls.....lb.	.05	.07	.05	.07	.07	.05	.08	.05
Selected bbls.....lb.	.09	.12	.09	.12	.12	.09	.12	.09
Powdered, bbls.....lb.	.02	.05	.02	.05	.05	.02	.05	.02
Sago Flour, 150 lb bags.....lb.	.04½	.05	.04½	.05	.05	.04½	.05	.04½
Sal Soda, bbls wks.....100 lb.	.....	1.00	.....	1.00	1.00	1.00	1.00	1.00
Salt Cake, 94-96% c-1 wks. .ton	15.50	19.00	15.50	19.00	24.00	15.50	24.00	19.00
Chrome .....ton	14.50	17.00	14.50	17.00	25.00	14.50	21.00	12.00
Saltpetre, double refd granular 450-500 lb bbls.....lb.	.06	.06½	.06	.06½	.06½	.06½	.06½	.06½
Satin, White, 500 lb bbls.....lb	.....	.01½	.....	.01½	.01½	.01½	.01½	.01½
Shellac Bone dry bbls.....lb.	.30	.32	.28	.29	.47	.28	.61	.47
Garnet, bags.....lb.	.22	.26	.24	.26	.40	.24	.45	.40
Superfine, bags.....lb.	.18	.20	.19	.22	.39	.20	.47	.39
T. N. bags.....lb.	.16½	.18½	.....	.17	.34	.18	.44	.36
Schaeffer's Salt, kegs.....lb.	.53	.57	.53	.57	.57	.53	.57	.53
Silica, Crude, bulk mines....ton	8.00	11.00	8.00	11.00	11.00	8.00	11.00	8.00
Refined, floated bags.....ton	22.00	30.00	22.00	30.00	30.00	22.00	30.00	22.00
Air floated bags.....ton	.....	32.00	.....	32.00	32.00	32.00	32.00	32.00
Extra floated bags.....ton	32.00	40.00	32.00	40.00	40.00	32.00	40.00	32.00
Soapstone, Powdered, bags f. o. b. mines.....ton	15.00	22.00	15.00	22.00	22.00	15.00	22.00	15.00

Soda

Soda Ash, 58% dense, bags c-l wks.....100 lb.	.....	1.17½	.....	1.17½	1.40	1.40	1.40	1.40
58% light, bags.....100 lb.	.....	1.15	.....	1.15	1.34½	1.34½	1.34½	1.34½
Contract, bags c-l wks.100 lb.	.....	.....	.....	.....	1.32	1.32	1.32	1.32
Soda Caustic, 76% grnd & flake drums.....100 lb.	.....	2.90	.....	2.90	3.35	3.00	3.35	3.35
76% solid drs.....100 lb.	.....	2.50	.....	2.50	2.95	2.90	2.95	2.95
Sodium Acetate, tech....450 lb. bbls wks.....lb.	.....	.05	.04½	.05	.05½	.04	.06½	.04½
Arsenate, drums.....lb.	.18	.19	.18	.19	.19	.18	.19	.18
Arsenite, drums.....gal.	.50	.75	.50	.75	1.00	.50	1.50	.75
Bicarb, 400 lb bbl NY..100 lb.	.....	.....	.....	.....	2.41	2.41	2.41	2.41

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - May 1931 $1.369

gen producers is the meeting in Paris attempting to prolong further the agreement made a year ago. The world production of fixed nitrogen, which up to 1928 was steadily absorbed by consuming industries, has since out distanced the rate of consumption by a wide margin and piled up stocks of unprecedented magnitude, says the Department of Commerce. It is estimated that the aggregate production capacity of the world increased from 1,500,000 tons in 1927-1928 to 3,500,000 tons in 1930-1931. With continuing expansion, the world capacity is expected to reach to 3,600,000 tons in 1931-1932. The expansion has been the greatest in North America and France. Chances for an immediate increase in consumption are slight in view of the present economic situation. Agriculture is suffering in common with industry, from overproduction of the most important crops and the desire to increase the yield by more intensive fertilizing is no longer in evidence. The world consumption of nitrogen is estimated for 1931-1932 at 2,000,000 tons. Since a large part of this demand is supplied by Chilean nitrate, calcium cyanamide and by-product nitrogen, the fixed nitrogen industry will be able to dispose of about 750,000 tons, as against 2,250,000 tons of total production capacity. It means that about 65 per cent of the production capacity of the industry will remain unused and the activity will be limited to 35 per cent. The world stocks of nitrogen have been left out of consideration in the above estimates. They amount at present between 900,000 and 1,000,000 tons, and the future activity naturally will have to be moderated further by the necessity to reduce this unproductive accumulation of stocks.

Sodium Phosphate — The keenly competitive position of both the di and the tri salt continued to prevent anything like stabilized prices and the published quotations were being shaded on sizable quantities. A slight improvement in demand was noticeable for the tri salt from retailers. Shipments of the di salt into the weighting centers were about equal to April.

Sodium Silicate — The volume of shipments into the soap industry was reported as being larger than for some months past while the corrugated box board manufacturers were somewhat slower. Movement of the water white into the silk weighting centers was better. Prices were firm and unchanged.

Sulfur — Prices continued to hold firm and demand other than from the fertilizer field was normal.

	Current Market	1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Bichromate, 500 lb cks wks..lb.	.07	.07½	.07	.07½	.07½	.07	.07½	.07
Bisulfite, 500 lb bbl wks....lb.	.....	.04	.....	.04	.04	.04	.04	.04
Carb. 400 ib bbls NY..100 lb.	.....	2.30	.....	2.30	2.30	2.30	1.35	1.30
Chlorate, ... wks..lb.	.05½	.07½	.05½	.07½	.08	.05½	.11	.06½
Chloride, technical.....ton	12.00	13.00	12.00	13.00	13.00	12.00	13.00	12.00
Cyanide, 96-98%, 100 & 250 lb drums wks.....lb.	.16	.17	.16	.17	.20	.16	.20	.18
Fluoride, 300 lb bbls wks...lb.	.08½	.08½	.08½	.08½	.09	.08½	.09	.08½
Hydrosulfite, 200 lb bbls f. o. b. wks.....lb.	.22	.24	.22	.24	.24	.22	.24	.22
Hypochloride solution, 100 lb cbys.....lb.	.....	.05	.....	.05	.05	.05	.05	.05
Hyposulfite, tech, pea cyrs 375 lb bbls wks.....100 lb.	2.40	3.00	2.40	3.00	3.00	2.40	3.05	2.50
Technical, regular crystals 375 lb bbls wks....100 lb.	2.50	2.65	2.50	2.65	2.65	2.50	2.65	2.40
Metanilate, 150 lb bbls.... lb.	.44	.45	.44	.45	.45	.44	.45	.45
Monohydrate, bbls.....lb.	.....	.02½	.....	.02½	.02½	.02½	.02½	.02½
Naphthionate, 300 lb bbl..lb.	.52	.54	.52	.54	.57	.52	.57	.54
Nitrate, 92%, crude, 200 lb bags c-1 NY.....100 lb.	.....	2.07	2.02	2.07	2.22½	1.99	2.22½	2.09
Nitrite, 500 lb bbls spot....lb.	.07½	.08	.07½	.08	.08	.07½	.08	.07½
Orthochlorotoluene, sulfonate, 175 lb bbls wks.....lb.	.25	.27	.25	.27	.27	.25	.27	.25
Oxalate Neut, 100 lb kegs..lb.	.37	.42	.37	.42	.42	.37	.42	.37
Perborate, 275 lb bbls.....lb.	.18	.20	.18	.20	.20	.18	.22	.18
Phosphate, di-sodium, tech. 310 lb bbls.....100 lb.	2.55	3.00	2.55	3.00	3.25	2.65	3.55	3.25
tri-sodium, tech, 325 lb bbls.....100 lb.	3.15	3.50	3.15	3.50	4.00	3.25	4.00	3.90
Picramate, 100 lb kegs.....lb.	.69	.72	.69	.72	.72	.69	.72	.69
Prussiate, Yellow, 350 lb bbl wks.....lb.	.11½	.12	.11½	.12	12½	.11½	.12½	.12
Pyrophosphate, 100 lb keg..lb.	.15	.20	.15	.20	.20	.15	.20	.15
Silicate, 60 deg 55 gal drs, wks .....100 lb.	.....	1.65	.....	1.65	1.65	1.65	1.65	1.65
40 deg 55 gal drs, wks .....100 lb.	.75	1.00	.75	1.00	.80	.70	.80	.70
Silicofluoride, 450 lb bbls NY .....lb.	.04	.04½	.04	.04½	.05½	.04	.05½	.05
Stannate, 100 lb drums....lb.	.23½	.26	.23½	.26	.43	.24	.43	.38
Stearate, bbls.....lb.	.20	.25	.20	.25	.29	.20	.29	.25
Sulfanilate, 400 lb bbls.....lb.	.16	.18	.16	.18	.18	.16	.18	.16
Sulfate Anhyd, 550 lb bbls c-1 wks.....lb.	.02½	.02½	.02½	.02½	.02½	.02½	.02½	.02½
Sulfide, 80% crystals, 440 lb bbls wks.....lb.	.02½	.02½	.02½	.02½	.02½	.02½	.02½	.02½
62% solid, 650 lb drums 1c-1 wks.....lb.	.03	.03½	.03	.03½	.03½	.03	.04	.03½
Sulfite, crystals, 400 lb bbls wks.....lb.	.03	.03½	.03	.03½	.03½	.03	.03½	.03
Sulfocyanide, bbls.....lb.	.28	.35	.28	.35	.35	.28	.76	.28½
Tungstate, tech, crystals, kegs .....lb.	.81	.88	.81	.88	.88	.81	1.40	.88
Solvent Naphtha, 110 gal drs wks.....gal.	.30	.38	.30	.38	.40	.30	.40	.35
Spruce, 25% liquid, bbls.....lb.	.....	.01½	.....	.01½	.01½	.01½	.01½	.01½
25% liquid, tanks wks.....lb.	.....	.01	.....	.01	.01	.01	.01	.01
50% powd, 100 lb bag wks lb.	.02	.02½	.02	.02½	.02½	.02	.02½	.02
Starch, powd., 140 lb bags .....100 lb.	.....	2.92	2.92	3.20	4.02	3.42	4.12	3.82
Pearl, 140 lb bags.....100 lb.	.....	2.82	2.82	3.00	3.92	3.32	4.02	3.72
Potato, 200 lb bags.....lb.	.05½	.06	.05½	.06	.06½	.05½	.06½	.05½
Imported bags.....lb.	.05½	.06½	.05½	.06½	.06½	.05½	.06½	.05½
Soluble.....lb.	.08	.08½	.08	.08½	.08½	.08	.08½	.08
Rice, 200 lb bbls.....lb.	.09	.10	.09	.10	.10	.09	.10	.09½
Wheat, thick bags.....lb.	.06½	.07	.06½	.07	.07	.06½	.07	.06½
Thin bags.....lb.	.09½	.10	.09½	.10	.10	.09½	.10	.09½
Strontium carbonate, 600 lb bbls wks.....lb.	.07½	.07½	.07½	.07½	.07½	.07½	.07½	.07½
Nitrate, 600 lb bbls NY....lb.	.09	.09½	.09	.09½	.09½	.09	.09½	.08½
Peroxide, 100 lb drs.....lb.	.....	1.25	.....	1.25	1.25	1.25	1.25	1.25
Sulfur								
Sulfur Brimstone, broken rock, 250 lb bag c-1.....100 lb.	.....	2.05	.....	2.05	2.05	2.05	2.05	2.05
Crude, f. o. b. mines.....ton	18.00	19.00	18.00	19.00	19.00	18.00	19.00	18.00
Flour for dusting 99½%, 100 lb bags c-1 NY....100 lb.	.....	2.40	.....	2.40	2.40	2.40	2.40	2.40
Heavy bags c-1.....100 lb.	.....	2.50	.....	2.50	2.50	2.50	2.50	2.50
Flowers, 100%, 155 lb bbls c-1 NY.....100 lb.	.....	3.45	.....	3.45	3.45	3.45	3.45	3.45
Roll, bbls 1c-1 NY.....100 lb.	2.65	2.85	2.65	2.85	2.85	2.65	2.85	2.65
Sulfur Chloride, red, 700 lb drs wks.....lb.	.05	.05½	.05	.05½	.05½	.05	.05½	.05
Yellow, 700 lb drs wks.....lb.	.03½	.04½	.03½	.04½	.04½	.03½	.04½	.03½
Sulfur Dioxide, 150 lb cyl....lb.	.07	.07½	.07	.07½	.07½	.07	.08½	.07
Extra, dry, 100 lb cyl.....lb.	.10	.12	.10	.12	.12	.10	.19	.10
Sulfuryl Chloride,..... ..lb.	.15	.40	.15	.40	.65	.10	.65	.10
Talc, Crude, 100 lb bgs NY...ton	12.00	15.00	12.00	15.00	15.00	12.00	15.00	12.00
Refined, 100 lb bgs NY..ton	16.00	18.00	16.00	18.00	18.00	16.00	18.00	16.00
French, 220 lb bags NY...ton	18.00	22.00	18.00	22.00	22.00	18.00	25.00	18.00
Refined, white, bags....ton	35.00	40.00	35.00	40.00	40.00	35.00	45.00	35.00
Italian, 220 lb bags NY...ton	40.00	50.00	40.00	50.00	50.00	40.00	50.00	40.00
Refined, white, bags....ton	50.00	55.00	50.00	55.00	55.00	50.00	55.00	50.00
Superphosphate, 16% bulk, wks.....ton	8.00	9.00	8.00	9.00	9.50	8.00	10.00	9.00
Triple bulk, wks.....unit	.....	.65	.....	.65	.65	.65	.....	.....
Tankage Ground NY.....unit	.....	2.60&10	2.60	3.20&10	4.00&10	3.20&10	4.50&10	4.00&10
High grade f.o.b. Chicago.unit	.....	2.90&10	3.00	3.25&10	3.85&10	3.25&10	4.80&10	3.75&10
South American cif.....unit	.....	3.10&10	3.20	3.40&10	4.25&10	3.40&10	4.80&10	4.35&10
Tapioca Flour, high grade bgs.lb.	.03½	.05	.03½	.05	.05½	.03	.05½	.04½
Medium grade, bags.....lb.	.03	.04	.03	.04	.04½	.02½	.04½	.03½
Tar Acid Oil, 15%,drums....gal.	.24	.25	.24	.25	.27	.24	.27	.26
25% drums.....gal.	.26	.28	.26	.28	.30	.26	.30	.29

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - May 1931 $1.369

Tanning Materials — Further improvement in demand was in evidence as the tanning trade started to expand operations. Several tanners who have been inactive for months were reported as soaking hides.

Tin — Reached a new low price of $22.40, a price that has not been equalled since 1899. Despite the restrictive measures the preliminary May figures were said to be unfavorable towards any improvement in the statistical position.

Turpentine — A very spirited demand for carlot shipments developed during the latter part of the month and proved to be the bright picture in the naval stores industry. The ruling price was quoted at 56½c.

Zinc Oxide — Consumption was reported to be holding to the level of the previous month. Prices were firm and unaltered.

OILS AND FATS

The market for both animal, fish and vegetable oils was a very dull and routine affair during the past month. Almost without exception prices worked down further to new low levels as buyers continued to strictly limit purchasing to only immediate needs. Stocks on hand in most instances have shown little tendency to decrease in the past three months and no improvement is in sight at the moment. Until these large surplusses are removed no general movement forward appears possible.

The Department of Commerce announced that the factory production of fats and oils (exclusive of refined oil and derivatives) during the three-month period ended March 31, 1931, was as follows: vegetable oils 675,868,188 pounds; fish oils, 11,586,728 pounds; animal fats, 618,458,848 pounds; and greases, 95,948,191 pounds; a total of 1,401,861,955 pounds. Of the several kinds of fats and oils covered by this inquiry, the greatest production 488,868,745 pounds appears for lard. Next in order is cottonseed oil with 395,406,614 pounds; tallow with 128,367,352 pounds; linseed oil with 118,417,218 pounds; coconut oil with 91,455,505 pounds, and corn oil with 28,652,287 pounds.

The production of refined oils during the period was as follows: Cottonseed, 396,855,042 pounds; coconut, 66,268,268

	Current Market	1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Terra Alba Amer. No. 1, bgs or bbls mills....100lb.	1.15	1.15	1.75	1.75	1.15	1.75	1.15
No. 2 bags or bbls...100lb.	1.50	1.50	2.00	2.00	1.50	2.00	1.50½
Imported bags.....lb.	.01½	.01	.01½	.01¼	.01½	.02½	.01
Tetrachlorethane, 50 gal dr...lb.	.09	.09	.09½	.09½	.09	.09½	.09
Tetralene, 50 gal drs wks.....lb.	.....	.20	.....	.20	.20	.20	.20
Thiocarbanilid, 170 lb bbl....lb.	.26½	.26½	.28½	.28½	.22	.24	.22
Tin Bichloride, 50% soln, 100 lb bbls wks.....lb.	.....	.12½	.....	.12½	.12½	.14½	.13½
Crystals, 500 lb bbls wks...lb.	.24	.25	.24	.28½	.34	.25	.38	.33
Metal Straits NY.....lb.	.22½	.23¾	.22½	.27	.38	.26	.48	.39
Oxide, 300 lb bbls wks.....lb.	.25	.29	.25	.29	.42	.25	.56	.42
Tetrachloride, 100 lb drs wks. .....lb.	.17½	.17½	.17½	.19½	.20½	.18½	.30½	.27½
Titanium Dioxide 300 lb bbl..lb	.21	.22	.21	.22	.50	.21	.50	.22
Pigment, bbls.....lb.	.06½	.07¾	.06½	.07¾	.07¾	.06½	.14	.07½
Toluene, 110 gal drs.....gal.	.....	.34	.....	.34	.40	.35	.45	.45
8000 gal tank cars wks....gal.	.28	.30	.28	.30	.35	.30	.40	.40
Toluidine, 350 lb bbls.....lb.	.88	.89	.88	.94	.94	.90	.94	.90
Mixed, 900 lb drs wks.....lb.	.27	.32	.27	.32	.32	.27	.32	.31
Toner Lithol, red, bbls.....lb.	.90	.95	.90	.95	.95	.90	.95	.85
Para, red, bbls.....lb.	.....	.80	.....	.80	.80	.80	.80	.70
Toluidine .....lb.	1.50	1.55	1.50	1.55	1.55	1.50	1.55	1.50
Triacetin, 50 gal drs wks.....lb.	.32	.36	.32	.36	.36	.32	.36	.32
Trichlorethylene, 50 gal dr...lb.	.10	.10½	.10	.10½	.10½	.10	.10½	.10
Triethanolamine, 50 gal drs...lb.	.40	.42	.40	.42	.42	.40	.60	.55
Tricresyl Phosphate, drs.....lb.	.33	.45	.33	.45	.45	.33	.45	.33
Triphenyl guanidine.....lb.	.58	.60	.58	.60	.60	.58	.70	.58
Phosphate, drums.....lb.	.60	.70	.60	.70	.70	.60	.75	.60
Tripoli, 500 lb bbls.....100 lb.	.75	2.00	.75	2.00	2.00	1.75	2.00	1.75
Tungsten, Wolframite,..per unit	11.25	11.75	11.25	11.75	.....	.....	.....	.....
Turpentine carlots, bbls.....gal.	.56½	.57	.54	.57	.61½	.41	.65	.51½
Wood Steam dist. bbls....gal.	.51	.61	.47	.61	.52	.36	.57	.49
Urea, pure, 112 lb cases.....lb	.15	.17	.15	.17	.17	.15	.30	.15
Fert. grade, bags c.i.f.....ton	....	108.00	.....	108.00	108.00	108.00	105.00	98.00
c. i. f. S. points.....ton	.....	109.30	.....	109.30	109.30	109.30	106.30	99.30
Valonia Beard, 42%, tannin bags.....ton	.....	40.00	.....	40.00	40.00	39.50	55.00	42.00
Cups, 30-31% tannin.....ton	24.00	25.00	24.00	25.00	27.00	24.00	35.00	30.00
Mixture, bark, bags.....ton	30.00	31.00	30.00	31.00	32.50	30.00	43.00	35.00
Vermillion, English, kegs....lb..	1.75	1.80	1.75	1.80	2.05	1.75	2.05	2.00
Vinyl Chloride, 16 lb cyl.....lb.	.....	1.00	.....	1.00	1.00	1.00	1.00	1.00
Wattle Bark, bags.....ton	36.25	37.00	36.25	41.00	47.75	40.00	49.75	43.50
Extract 55%, double bags ex-dock.....lb.	.05⅞	.06½	.05⅞	.06½	.06½	.05⅞	.06½	.06½
Whiting, 200 lb bags, c-1 wks .....100 lb.	.....	1.00	.....	1.00	1.00	1.00	1.25	1.00
Alba, bags c-1 NY.....ton	.....	13.00	.....	13.00	13.00	13.00	13.00	13.00
Gilders, bags c-1 NY...100 lb.	.....	1.35	.....	1.35	1.35	1.35	1.35	1.35
Xylene, 10 deg tanks wks. .gal.	.....	.28	.....	.28	.31	.28	.33	.33
Commercial, tanks wks...gal.	.25	.30	.25	.30	.33	.25	.32	.30
Xylidine, crude.....lb.	.....	.37	.....	.37	.38	.37	.38	.38

Zinc

Zinc Ammonium Chloride powd., 400 lb bbls.....100 lb.	5.25	5.75	5.25	5.75	5.75	5.25	5.75	5.25
Carbonate Tech, bbls NY..lb.	.10½	.11	.10½	.11	.11	.10½	.11	.10½
Chloride Fused, 600 lb drs. wks.....lb.	.05¾	.06	.05¾	.06	.06	.05¾	.06	.05¾
Gran., 500 lb bbls wks.....lb.	.05¾	.06	.05¾	.06	.06½	.05¾	.06½	.06½
Soln 50%, tanks wks...100 lb.	2.25	3.00	2.25	3.00	3.00	2.25	3.00	3.00
Cyanide, 100 lb drums.....lb.	.38	.39	.38	.39	.41	.38	.41	.40
Dithiofuroate, 100 lb dr....lb.	.....	1.00	.....	1.00	1.00	1.00	1.00	1.00
Dust, 500 lb bbls c-1 wks...lb.	.06	.07	.06	.07	.11	.06	.08½	.08½
Metal, high grade slabs c-1 NY.....100 lb.	.....	3.60	3.60	4.45	6.45	4.10	6.45	6.45½
Oxide, American bags wks..lb.	.06½	.07	.06½	.07	.07½	.06½	.07½	.07
French, 300 lb bbls wks...lb.	.09½	.11½	.09½	.11½	.11½	.09½	.11½	.09½
Perborate, 100 lb drs.....lb.	.....	1.25	.....	1.25	1.25	1.25	1.25	1.25
Peroxide, 100 lb drs.....lb.	.....	1.25	.....	1.25	1.25	1.25	1.25	1.25
Stearate, 50 lb bbls.....lb.	.19	.22	.19	.23	.26	.20	.26	.25
Sulfate, 400 bbl wks.....lb.	.03	.03½	.03	.03½	.03½	.03	.03¾	.03
Sulfide, 500 lb bbls.....lb.	.16	.16½	.16	.16½	.32	.16	.32	.30
Sulfocarbolate, 100 lb keg..lb.	.28	.30	.28	.30	.30	.28	.30	.28
Zirconium Oxide, Nat. kegs...lb.	.02½	.03	.02½	.03	.03	.02½	.03	.02½
Pure kegs.....lb.	.45	.50	.45	.50	.50	.45	.50	.45
Semi-refined kegs.....lb.	.08	.10	.08	.10	.10	.08	.10	.08

Oils and Fats

Castor, No. 1, 400 lb bbls.....lb.	.11	.12	.11	.12	.13½	.11½	.13½	.13
No. 3, 400 lb bbls.....lb.	.10½	.11	.10½	.11¼	.13	.11	.13	.12½
Blown, 400 lb bbls.....lb.	.13½	.14	.13½	.14	.15	.12	.15	.14
China Wood, bbls spot NY...lb.	.07	.07½	.07	.07½	.13	.07	.16	.14½
Tanks, spot NY.....lb.	.06¼	.06½	.06	.07	.11⅜	.06	.15	.13½
Coast, tanks, ...lb.	.06	.06½	.05½	.06½	.10⅛	.05½	.14¼	.12½
Cocoanut, edible, bbls NY....lb.	.....	.10¾	.....	.10¾	.10¾	.10¾	.10¾	.10¾
Ceylon, 375 lb bbls NY....lb.	.06½	.06½	.06¼	.06½	.08¼	.06⅜	.09¼	.07⅛
8000 gal tanks NY.....lb.	.04¼	.05	.04¼	.06	.07	.05½	.08⅜	.06⅜
Cochin, 375 lb bbls NY....lb.	.06⅜	.07	.06⅜	.07	.09¼	.07¼	.10	.09⅛
Tanks NY.....lb.	.05⅜	.05¾	.05⅜	.05¾	.08⅜	.07	.09¼	.08⅜
Manila, bbls NY.....lb.	.06¼	.07	.06¼	.07	.08¼	.06½	.09¼	.07⅛
Tanks NY.....lb.	.05	.05¼	.04⅞	.05¼	.07⅛	.05⅜	.08⅜	.06⅛
Tanks, Pacific Coast.....lb.	.04⅞	.04⅞	.04⅞	.05	.07	.05⅛	08	.06¼

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - May 1931 $1.369

pounds; peanut, 4,089,847 pounds; corn, 26,129,525 pounds; soya-bean, 2,108,114 pounds; andpalm-kernel, 5,542,826 pounds.

RAW MATERIALS USED IN THE MANUFACTURE OF VEGETABLE OILS

Kind	Tons of 2,000 pounds Consumed January 1 to Mar. 31	On hand March 31
Cottonseed	1,272,284	206,926
Peanuts, hulled	6,219	1,970
Peanuts, in the hull	2,641	467
Copra	71,229	27,149
Coconuts and skins	609	26
Corn gorms	54,612	171
Flaxseed	183,980	65,661
Castor beans	13,338	3,845
Sesame seed	12,113	3,954
Soya-beans	32,315	34,549
Olives	4,661	.....
Other kinds	3,240	1,533

IMPORTS OF FOREIGN FATS AND OILS, QUARTER ENDED MARCH 31, 1931

Kind	Pounds
Animal oils & fats, edible	536,244
Whale oil	51,044,310
Cod oil	2,792,820
Cod-liver oil	3,007,305
Other fish oils	2,857,658
Tallow	108,806
Wool grease	1,115,475
Stearic acid	1,128,048
Grease and oils, n.e.s.(value)	$20,425
Olive oil, edible	12,985,333
Peanut oil	536,951
Other edible vegetable oils	8,304,005
Tung oil	17,408,897
Coconut oil	96,273,974
Sulphur oil or olive foots	6,008,644
Other olive oil, inedible	2,956,843
Palm oil	74,592,232
Palm-kernel oil	4,862,288
Sesame oil	.....
Cornauba wax	2,670,312
Other vegetable wax	511,114
Rape (colza) oil	2,917,673
Linseed oil	91,672
Soya-bean oil	1,453,583
Perilla oil	2,381,843
Other expressed oils	513,512
Glycerin crude	2,914,104
Glycerin, refined	485,204

EXPORTS OF FOREIGN FATS AND OILS, QUARTER ENDED MARCH 31, 1931

Kind	Pounds
Animal fats & oils, edible	1,873
Fish oils	35,194
Other animal oils & fats, inedible	9,506
Olive oil, edible	26,278
Tung oil	1,278,524
Coconut oil	304,385
Palm & palm-kernel oil	375,853
Peanut oil	6,574,406
Soya-bean oil	60,266
Other expressed oils & fats	1,552,279
Vegetable wax	183,309

EXPORTS OF DOMESTIC FATS AND OILS, QUARTER ENDED MARCH 31, 1931

Kind	Pounds
Oleo oil	12,567,488
Oleo stock	1,299,657
Tallow	1,470,934
Lard	196,036,872
Lard, neutral	2,767,522
Lard compounds, containing animal fats	356,613
Oleo stearin	1,521,724
Neat's-foot oil	270,125
Other animal oils, inedible	216,513
Fish oils	736,362
Grease stearin	1,372,416
Oleic acid, or red oil	188,415
Stearic acid	128,293
Other animal greases & fats	20,438,415
Cottonseed oil, crude	5,235,180
Cottonseed oil, refined	5,699,097
Coconut oil, crude	2,613,064
Coconut oil, refined	583,233
Corn oil	301,083
Soya-bean oil	953,863
Vegetable oil lard compounds	1,376,252
Other edible vegetable oils and fats	418,121
Linseed oil	317,142
Other expressed oils and fats, inedible	3,540,587
Vegetable soap stock	6,660,020
Glycerin	78,204

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Cod, Newfoundland, 50gal bbls ..... gal.	.46	.48	.41	.48	.56	.46	.64	.57½
Tanks NY ..... gal.	.44	.45	.39	.45	.62	.48	.60	.60
Cod Liver see Chemicals								
Copra, bags ..... lb.	.0235	.0275	.0235	.0325	.046	.039	.05½	.042
Corn, crude, bbls NY ..... lb.	.07	.09	.07	.09	.10	.08½	.10¼	.09½
Tanks, mills ..... lb.	.05½	.06	.05½	.07½	.08	.06½	.09¼	.07½
Refined, 375 lb bbls NY.... lb.	.10½	.10½	.10½	.10½	.10¼	.09¼	.11¼	.10½
Tanks ..... lb.	.08½	.08¾	.08½	.08¾	.10	.08	.11	.09
Cottonseed, crude, mill ..... lb.	.06¾	.07	.06½	.07	.07½	.06½	.09	.08½
PSY 100 lb bbls spot ..... lb.	.08	.09	.074	.09	.088	.076	.1075	.085
Mar ..... lb.	.....	.0748	.....	....	....	....	.....	....
Degras, American, 50 gal bbls NY ..... lb.	.04½	.04½	.04	.04½	.04½	.03½	.05	.03½
English, brown, bbls NY.... lb.	.04½	.05	.04½	.05	.05	.04½	.05¼	.04½
Light, bbls NY ..... lb.	.05	.05½	.05	.05½	.05½	.05	.05¼	.05
Dog Fish, Coast Tanks ..... gal.	.....	.32	.....	.32	.34	.32		
Greases								
Greases, Brown ..... lb.	.04½	.04½	.03¾	.04½	.06½	.04	.08½	.06
Yellow ..... lb.	.04½	.05	.03	.05	.07½	.03¾	.08½	.06½
White, choice bbls NY ..... lb	.04	.04½	.04	.05¾	.08½	.06	.11¼	.07½
Herring, Coast, Tanks ..... gal.	.....	Nom.	.....	Nom.	.....	.....		
Horse, bbls ..... lb.	.05½	Nom.	.05½	Nom.	Nom.	.05½	Nom.	.....
Lard Oil, edible, prime ..... lb.	.12½	.13	.12½	.13	.13½	.12½	.15¾	.14¼
Extra, bbls ..... lb.	.08½	.09	.08½	.10	.12	.10	.13½	.12
Extra No. 1, bbls ..... lb.	.07½	.08	.07¼	.09¼	.11	.09½	.13¼	.11¼
Linseed, Raw, five bbl lots ... lb.	.088	.09	.088	.102	.146	.096	.162	.105
Bbls c-l spot ..... lb.	.084	.09	.084	.098	.142	.092	.158	.101
Tanks ..... lb.	.078	.08	.078	.092	.134	.086	.15	.093
Menhaden Tanks, Baltimore . gal.	.21	.22	.21	.22	.50	.21	.52	.45
Blown, bbls NY ..... lb.	.07½	.08	.07½	.08	.09	.07½	.09	.09
Extra, bleached, bbls NY.. gal.	.47	.49	.52	.53	.70	.52	.70	.70
Light, pressed, bbls NY ... gal.	.....	.38	.36	.38	.64	.36	.64	.63
Yellow, bleached, bbls NY. gal.	.....	.42	.38	.42	.67	.38	.67	.66
Mineral Oil, white, 50 gal bbls ..... gal.	.40	.60	.40	.60	.60	.40	.60	.40
Russian, gal ..... gal.	.95	1.00	.95	1.00	1.00	.95	1.00	.95
Neatsfoot, CT, 20° bbls NY . lb.	.15	.16	.15	.16	.17½	.16½	.19	.18½
Extra, bbls NY ..... lb	.08	.08½	.08	.10	.11½	.09½	.13½	.12
Pure, bbls NY ..... lb.	.10¼	.11	.10¼	.12	.13½	.11½	.15½	.13½
Oleo, No. 1, bbls NY ..... lb.	.07½	.07½	.07½	.08	.12½	.08¾	.11½	.10¼
No. 2, bbls NY ..... lb.	.06½	.07	.06½	.08	.11	.08½	.11½	.10
No. 3, bbls NY ..... lb.	.08	.09	.08	.09	.10½	.09	.10¼	.09½
Olive, denatured, bbls NY... gal.	.82	.85	.82	.85	1.00	.70	1.40	1.05
Edible, bbls NY ..... gal.	1.75	2.00	1.75	2.00	2.00	1.75	2.00	1.95
Foots, bbls NY ..... lb.	.06½	.06¾	.06½	.06¾	.08	.06	.11½	.08½
Palm, Kernel, Casks ..... lb.	.04¾	.05	.04¾	.06¼	.08½	.06	.09	.08
Lagos, 1500 lb casks ..... lb.	.05	.06	.05	.06	.07¾	.05½	.09	.07½
Niger, Casks ..... lb.	.04	.04½	.04	.05½	.07½	.05½	.08¾	.07
Peanut, crude, bbls NY ..... lb.	.....	Nom.	.....	Nom.	Nom.	.....	Nom.	.....
Refined, bbls NY ..... lb.	.11	.12½	.11	.14	.15	.12	.15	.14½
Perilla, bbls NY ..... lb.	.09	.11	.09	.11	.14½	.10	.20	.15
Tanks, Coast ..... lb.	.06½	.07	.06½	.09	.11½	.08	.15¾	.13
Poppyseed, bbls NY ..... gal.	1.70	1.75	1.70	1.75	1.75	1.70	1.75	1.70
Rapeseed, blown, bbls NY... gal.	.71	.73	.71	.73	1.00	.74	1.04	1.04
English, drms. NY ..... gal.	.....	.75	.....	.75	.82	.75	.90	.82
Japanese, drms. NY ..... gal.	.56	.58	.56	.58	.70	.56	.88	.72
Red, Distilled, bbls ..... lb.	.08¾	.09	.08¾	.09	.10¾	.08¾	.11¾	.10¼
Tanks ..... lb.	.07½	.08¼	.07½	.08¼	.09¼	.07¾	.10½	.09¼
Salmon, Coast, 8000 gal tks.. gal.	.....	.22	.22	.22	.44	.42	.44	.42
Sardine, Pacific Coast tks ... gal.	.18	.19	.18	.19	.42	.18	.51	.45
Sesame, edible, yellow, dos ... lb.	.09½	.10¾	.09½	.10¾	.12	.09	.12	.11½
White, dos ..... lb.	.....	.12	.10	.12	.12½	.10	.12¼	.12½
Sod, bbls NY ..... gal..	.....	.40	.....	.40	.40	.40	.40	.40
Soy Bean, crude								
Pacific Coast, tanks ..... lb.	.06	.07	.06	.08	.09¼	.07	.10¼	.09
Domestic tanks, f.o.b. mills, ... lb.	.065	.07	.065	.07	.08½	.07	.10½	.08½
Crude, bbls NY ..... lb.	.073	.08	.073	.08	.10¾	.10	.12¾	.11¼
Tanks NY ..... lb.	.065	.07	.065	.08	.09¾	.09	.11½	.10½
Refined, bbls NY ..... lb.	.08	.09	.08	.09	.13½	.13	.13½	.13½
Sperm, 38° CT, bleached, bbls NY ..... gal.	.84	.85	.84	.85	.85	.84	.85	.84
45° CT, bleached, bbls NY gal.	.79	.80	.79	.80	.80	.79	.80	.79
Stearic Acid, double pressed dist bags ..... lb.	.09½	.11	.09½	.11	.15	.13½	.18½	.15½
Double pressed saponified bags ..... lb.	.10½	.12	.10½	.12	.15½	.14½	.19	.15½
Triple, pressed dist bags .. lb	.12	.14	.12	.14	.17	.15½	20½	.17¾
Stearine, Oleo. bbls ..... lb.	.09	.08¾	68½	.08¾	.09½	.08¼	.12	.09¾
Tallow City, extra loose ..... lb.	.03½	.04	.03½	.04	.07¾	.04¼	.08¼	.07
Edible, tierces ..... lb.	.04	.04½	.04	.06	.09½	.05½	.10½	.08
Tallow Oil, Bbls, c-1 NY.. lb.	.07	.07½	.07	.08½	.11	.08½	.12	.10¾
Acidless, tanks NY ..... lb.	.07¾	.09	.07¾	.09	.10	.08¼	.11	.09¾
Vegetable, Coast mats ..... lb.	.06	Nom.	.06½	Nom.	Nom.	.06½	Nom.	.08
Turkey Red, single bbls ..... lb.	.08¾	.09	.08¾	.10	.12	.10	.12	.11
Double, bbls ..... lb.	.10	.12	.12	.10	.16	.13	.16	.14
Whale, bleached winter, bbls NY ..... gal.	.....	.74	.....	.74	.74	.74	.80	.74
Extra, bleached, bbls NY.. gal.	.75	.77½	.75	.77½	.76	.76	.82	.76
Nat. winter, bbls NY ..... gal.	.69	.70	.69	.72	.73	.73	.78	.73

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Index to Advertisers

Index to Advertisers

"We"—Editorially Speaking

Last summer John Boyer showed us the manuscript of a short article he had written and asked if we would publish it. We wanted to do so—badly: but at the same time he had submitted copies to several friends and associates who dissuaded him. He withdrew his permission to print it on their advice that it was "preachy", "ill-timed", and "would do no good." Subsequent events in the chemical markets have proved that it was a timely warning full of sound, homespun advice. It might not have prevented some of the uneconomic policies followed since last summer, but it plainly pointed out their causes and forecast the results we know too well today. We are violating no sacred confidences if we tell the title of that essay. He called it "Patience". Which proverbially is a desirable quality—"never found in woman and seldom in a man".

Without question a majority of companies sending representatives and spending good money at the Chemical Exposition felt that they would not be repaid for the trouble and expense. Before the Show closed, they were enthusiastic about the sales made and the contacts formed. Another unexpected reaction was the favorable comments of the strictly chemical manufacturing companies exhibiting. Without exception those interviewed, expressed complete satisfaction with the objectives gained. Such sentiments speak well for the prospect of restoring chemical business to a sounder basis. A word of praise is due the exhibitors who in uncertain times had the courage to show their wares. As is always the case they will reap direct benefit. A word of commendation is due the Exposition Management for the usual excellent manner in which the Show was conducted. Both the number of exhibitors and persons viewing the Exposition was large, if not a new record. Those viewing the Show were serious-minded and in most instances directly connected with the industry in some capacity. The 13th Exposition was a decided aid to restoring business to a normal pace.

An interesting development in the chemical field at this moment is the employment of technical publicity directors by an increasing number of companies. The title may be that of Director of Public Relations or Advertising Manager, or some modification of either of the two. The work, however, is that of placing the name of the company, its personnel and its products, before the public in the right light and to secure as much publicity as possible. One does not need to be old and bent to see the change in thought that this movement represents. But a relatively few years ago everything connected with our chemical companies was mysterious. Today without giving away any secrets of manufacturing or valuable commercial information, such men as Quigley of Bakelite, Darlington of Hercules, Hutchins of Swann, Sturahahn of Monsanto, Landy of R. & H., Schmertz of Mathieson and Robertson of Merck are doing a good job securing the right kind of publicity for their respective companies. These men are more than advertising managers—they are specialists in a peculiar field of endeavor that is becoming recognized as a necessity in the present day of large corporations. It is the familiar story that where a good man, suitably trained, is assigned to a definite problem, results soon begin to show in the form of worthwhile dividends.

BY-PRODUCTS

The Chemists are a strange class of mortals impelled by an almost insane impulse, to seek their pleasure among smoke and vapor, soot and flames, poisons and poverty. Yet among all these evils I seem to live so sweetly, that may I die if I would change places with the Prussian king.

Physician Subterranea 1669
Johann Joachin Becher
(*From a framed quotation in the Chemists' Club, N. Y., Library*).

COMING FEATURES

"Manufacturing Fine Chemicals," a discussion of the problems of producing C. P. quality from technical grades, by J. Lucien Jones, J. T. Baker Chemical Co.

"New Applications of Ammonia," by M. H. Merriss. One of the most interesting of the newer developments.

"Synthetic Resins," "Their Newer Specialized Uses," by W. H. Nuttall. Another report on a field of endeavor that is timely and full of new ideas.

In the Plant Management Section, C.W. Johnson, Assistant Secretary of the Insurance Co., of North America and the man responsible for the "White Fireman" idea of fire prevention has a message equally pertinent to the men in the plant, plant managers and company executives. This is an article the president will want to pass down the line even to the office boy.

A story told in the *Wall St. Journal* about the late Robert W. De Forest is so pointed in its application that we reprint it. At the height of the roaring booms of 1928-1929 a friend, accosting him at a bank director's meeting, remarked—being enthusiastic:

"Great times; everything buoyant, everything flourishing, great Country. There is no top."

"I am sorry," commented Mr. De Forest. "It makes one blue—thinking of something."

"Blue ?" his questioner asked,"Thinking of what ?" he challenged.

"Tomorrow."

This story in reverse is equally true. The wise are smiling now and the less wise are wondering why. Those who are able to place a check on their pessimism, those who have the ability to see that now is the time to acquire assets at half, and even a third of their real value, those who can read between the lines and have continuously the vision before their eyes of renewed prosperity, are the ones who will build up something worthwhile for the future.

Sir Harry McGowan called direct attention in his speech before the stockholders of the I. C. I. to how the economic structure can become confused and distorted because of outside influences. Only half of Great Britain's huge nitrogen capacity involving an original expenditure, it is said of $100,000,000, is functioning. The I. G. plant at Merseburg capable of producing 600,000 metric tons of primary nitrogen is only operating, according to reports, at half capacity. What per cent is functioning here is not known. McGowan's complaint is to the effect that every little two by four country in Europe is saddled with a synthetic nitrogen plant far in excess of its agricultural and industrial needs, purely as a protective war measure. Perhaps what we need is a nitrogen disarmament conference and we suppose that might very easily be the unofficial title for the meeting in progress now in Paris seeking to continue the international cartel. As usual we will be on the side-lines.